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SEPT. 10, 1951

50 CENTS



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Aviation Week



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NEWS DIGEST

DOMESTIC

First Medal of Honor for an aviator in Korea was presented posthumously to son and widow of Maj. Louis J. Schell at a formal dinner at March AFB, Riverside, Calif. by USAF Chief of Staff, Gen. Hoyt S. Vandenberg. Maj. Schell was commander of the 47th Fighter Bomber Group and was killed while flying an F-51 Mustang against a ground concentration of troops, artillery and armored vehicles.

Personal and executive type aircraft depots during July totaled 799, worth \$1,127,064, according to Joseph T. Goring, Jr., of the Personal Aircraft Council of the AEA. Four plane craft accounted for 146 of the total, 55 were two-place and 2 were one-place.

CIO United Auto Workers struck Wednesday at Douglas Aircraft Co.'s 15,000-employee Long Beach plant. Negotiations over wages and working conditions had broken down. The union's executive board acquiesced about 10,000 of the workers at the Long Beach plant.

Air Force was scheduled to take over Beechler McGee modification center at Birmingham Aug. 25. Honey Aircraft Corp. will modify B-35 Mitchell bombers there under a \$5.6-million contract. Honey employment will start at 1,000, may rise to 5,000 when company starts remodeling Douglas C-124 cargo craft.

Gen. George C. Kenney, Air Force's second-in-command, officer in point of view, retired, with 16 years less work after 35 years of service. During retirement retirement, Kenney, whose award number is 14, was decorated with his last Distinguished Service Medal and the Legion of Merit by Gen. Hoyt S. Vandenberg. The colonel was staff turned out to honor General Kenney.

We supply transports, sold by CAA from storage, bought the agency 5836, 051. TWA paid \$120,000 for an old type Constellation, EAL bought a C-54 for \$155,000, and Transwestern Air Lines bought a C-54 for \$120,051.

Maj. Gen. E. F. Timberlake, Jr. has been named commanding general of Tactical Air Command's Ninth Air Force, according to Maj. Gen. W. R. Holloman. Gen. Timberlake recently returned from the Far East where he has been serving since 1948.

FINANCIAL

Lockheed Aircraft Service, Inc. has a \$20.6-million backlog in construction,

overhead and modification work. Contracts include modification of Lockheed T-46 jets and North American F-51 Mustangs for the USAF, Lockheed C-121 Constellations and Boeing C-97 Stratofighters for MATS.

First atomic aircraft engine development contract has been awarded to Consolidated Vultee Aircraft Corp. by North Dakota General Electric for the engine development contract. Development will be joint Convair-GE project.

California Eastern Airways, Inc. is partly opening revenues of \$1,717,000 for the six months ending June 30, 1951. After provision for taxes and depreciation, net profit for the period was \$32,064. Company says these figures reflect the cumulative effect of transport services, acquisition of one tract flight training operations at Columbus, Miss., and equipment installation under government contract at CFA's Oakland, Calif., base.

INTERNATIONAL

Boeing-Turner Propaganda Limited is a new London affiliate formed in Australia to manufacture and distribute equipment for the aircraft and electronic fields. The new firm will be jointly owned by Boeing and Turner Limited, of Massachusetts, Australia, on a 48-52% basis.

Four new aircraft models were claimed by the Jetstar for a special October flight with American Holiday Jet plane jet engines. Models and sizes: 1, max 16 sec. to 9,935 ft. (10,000 meters), 1 max 10 sec. to 10,700 ft., 2 max 25 sec. to 14,500 ft., 3 max 7 sec. to 10,400 ft.

Negus Nasad, a British Devel gas turbine engine plus a gas turbine, is currently being at a modified Air Lincoln testbed. The Nasad uses the Devel to drive one of two rotating propellers and the exhaust gases from the engine to drive a turbine which turns the other prop.

English Electric Canberra set new contract from Alitalia record of 4 by 15 min from Alitalia, Northern Ireland in Gander, Newfoundland. Average speed for the 2,071 mi. trip was 460.2 mph. Wing Chief Roland J. Beaumont, English Electric's chief test pilot, flew the mission. Canberra completed flight Tuesday, arriving at Glensie L. Martin Co., Baltimore.

Lead-sensitive ROTOReHe



Photographed leads a golf ball to show size and control device.

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- See condensed literature in 1951 L.A.S. Association Engineering Catalog or write for Bulletin 119

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INDUSTRY OBSERVER

Now that Douglas is well along with its first C-124B helicopter heavy transport, it is trying to use a USAF production order for more of the helicopter cargo plane. Availability of Pratt & Whitney T-14s, which power the plane, may decide how soon a quantity order is arranged.

The 90-ft. diameter test capacity of the Wright Air Development Center helicopter rotor test tower at Dayton is just about filled by the big 55-ft. diameter rotor of the Paucel XR-10 transport helicopter, with DC-4 size fuselage. A 4,000-hp electric motor which the rotor at the top of the 50-ft. high test tower to avoid ground suction effect. Plans call for installation of a television camera in the tower to observe the blades.

The reconnaissance version of the Boeing B-47 has been delayed as a result of the switch in production programs, delaying the B-47C and putting immediate emphasis on the less powerful but more immediately available B-47B. It had been planned to deliver the B-47C out of the B-47C plant, so the switch necessitated a considerable modification in plans for the photo plane to make it adaptable to the B-47B program. The B-47B version, although slower than the contemplated B-47C, will be considerably faster than any recon plane now available to the USAF, and probably the only one able to keep up with the B-47 bombers, even a several thousand mile mission.

New type rubberized-epoxy pneumatic lifting bags, to boost planes that have made belly landings or have damaged landing gear, have been developed by USAF by U. S. Rubber Co. Bags are capable of operation at temperatures as low as minus 55 deg. F. Older E-1 type critical lifting bags were useless at temperatures below minus 30 degrees. New P-2 design is only a few inches high when not inflated, but inflates to 6 ft. height, and at a pressure of 3.5 psi. will lift 12 tons.

New possibilities for free-fall aerial delivery techniques are being opened by an experimental development of General Tire & Rubber Co. and the Army. This is a liquid container, made of synthetic rubber, which bursts when it hits. Skin currently tested holds five gal. of gasoline, has been dropped repeatedly from altitudes up to 2,000 ft. for a free fall without changing its contents up to the developed container.

The Sacred Cove, first parabolic alkydase, was one of the first Douglas C-54s to get a vinyl modification at the newly opened Texas Engineering and Manufacturing overhaul base at Mayfield, Greenville, Tex., under a huge new contract for continuing cycle overhauls on C-54s. The plane is still used to transport very important people (VIP) by Military Air Transport Service.

Paucel has installed the tail boom and tail surfaces of its XC-113 Park Plane, to correspond with the revised dorsal fin on the boom and backed up tail surface of its late C-119C Puma combat transport.

Sundeen-Roe Inc., which has taken over the development contract for the Corvus Air Hawk helicopter from the original Corvus Aerospace Co., has completed a drawing of the assembly and construction of the No. 2 Air Hawk WA-555. This was done because of the crash of the original machine, which was attributed to the fatigue failure of a small link in one of the rotor heads. The WA-555 has been reexamined and preliminary engine test have been completed. Ground runs and flight tests are expected later this fall.

Douglas' first four XR-52 is expected to meet its schedule for rollout at Seattle in October, and first flight before year's end, now that it appears that sufficient Pratt & Whitney J-35 engines will be delivered on schedule. Meanwhile General's XR-64 (preparing development of the B-56) is not due to get its J-55, probably until early next year.

Results of experiments with the 60-degree delta wing XF-82A Current jet plane are giving the General's continuing research program to develop high speed water-based aircraft, with blended wing-body design. Tests indicate the feasibility of developing a water-based fighter-bomber, carrying pilot and radio operator, and capable of speeds up to Mach 0.95, it has been disclosed.

WHO'S WHERE

In the Front Office

Benjamin A. Moss, Jr., has been named vice president-engineering for Aerospace Corp., Jackson, Mich., and H. L. Schmidt, Jr., has been designated vice president-treasury. Moss has been with the company since 1942, in staff development positions. Schmidt joined Aerospace in 1947.

W. Gordon Wood has been designated vice president-traffic for Trans-Canada Airlines and will also represent the airline as traffic matters in the International Air Transport Association. He succeeds Angus C. Makin, who recently resigned. Wood has been USA's general traffic manager since 1945.

Changes

R. M. Gooden has been made chief of glass of the development laboratory, physical division, Douglas Aircraft Corp. and will head up the newly expanded Plant 3 in Burbank.

N. W. Dooley has been designated as senior staff engineer executive for Convair San Diego division and Richard W. Pope has been named assistant chief of power of the firm's Grumman Aircraft Division.

Charles T. McElroy has been appointed assistant sales manager of Pratt & Whitney Aircraft to direct all military and commercial sales activities. John Kemp, Jr., will continue as the company's West Coast representative.

Named to the Board

William E. Boozing, Jr., has been named a director of Pacific Northwest Airlines.

Joseph V. Shields has been elected a director of Colonial Airlines. Capt. Max Wilborn, USNR, Staff, has been appointed manager of personal affairs, contracts and sales for Bellanca Aircraft Corp., Santa Ana, he had been with Bellanca in a consultant basis. Until his retirement after 16 years with the Navy in July, 1950, he had been an almost constant flight instructor.

Charles C. Becklund, a newly elected vice president of Minneapolis-Honeywell Aero Industrial division, will head a new group overseeing and expanding reengineering activities in the aeronautical and aerospace divisions. Other MH changes: M. P. Ford has been named manager of re-engineered operations; E. H. Salomon is director of engineering administration; Howard J. Stange is director of aero manufacturing.

Robert Corp. of America announces the appointment of Robert R. Allen, formerly a consultant for management engineering problems, has been named assistant general manager. Joseph V. Fox, formerly with Manning, Maxwell & Moore, has been named manufacturing manager. Francis D. Condit, formerly with Fairchild General Motors Inc., in production method representative. Earl Allen, formerly of Lockheed, USNR (Jr.), is director of customer relations.



133 out of 133 Martin 202's and 404's in service on on order are equipped with Hamilton Standard Hydromatic propellers. In fact Hydromatic's now are specified for 98% of all U. S. transports.



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even with SAE Specifications 95-437.



AVIATION WEEK

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SEPTEMBER 16, 1951

Not Enough Steel, Say AF and Industry

But NPA officials claim that structural allotments meet 'most urgent' demands.

By William Kruger

A fourth-quarter structural steel allotment announced by the National Production Authority last week was supposed to iron the kinks out of the thickets squawking papers. Instead, a pot larks in the bones of air planners and brought redoubt protests from aircraft makers and military officials.

In releasing the allotments of scarce steel needed to construct buildings and other facilities to build, test and equip defense troops, Defense Production Administration Marty Fleckenstein and the "all of the required structural steel for the most urgent" Air Force, Army and Navy programs was made available to manufacturers supplying the three services.

According to one Air Force official, that put us in a bind. According to a Munitions Board representative, that is a "very misleading" statement. According to an Aircraft Production Board spokesman, it is a "very misleading" statement. According to industry representatives in Washington, the allotment doesn't even come near meeting needs.

NPA Rebuttal—NPA officials who announced the allotment can't share the alarm, and point out that, as Fleckenstein said, the allotments are for the "most urgent" programs. The test was whether deferring a project until the first quarter of 1952 or later would harm the defense effort. Any applicant turned down now can reply in September for an allotment for the first quarter of 1952. In the same project, NPA planners think the fourth-quarter allotment does no harm to the defense effort.

They are giving priority of approval. An Air Force won't be officials how much structural steel would be required to meet the needs of its construction. But badly reliable estimates range between 100,000 and 150,000 tons.

The fourth-quarter allotment for Air Force construction totals 51,275 tons. One-Third Equals 106,955—That, says NPA, is 100% of AF's stated requirements. In contrast, AF officials say that applications for allotments sent to NPA with an AF's endorsement totaled considerably above that. A Munitions Board official estimates that the allotment to Air Force contractors is about

one-third of the total the Air Force requested.

The gulf between NPA and other government agencies and the industry apparently lies in a luridly gossamer "wind tunnel." What actually happened, it seems, is that an inter-agency committee took requests from all those wanting structural steel, reviewed them against a set of criteria, and sent in effect, "less, more risk as for steel for only projects meeting these criteria." So, the Air Force got steel for 100% of the projects meeting the criteria. But the services and the industry might agree that the criteria were too strictly applied. Here is the reasoning sketched.

- Facilities under construction to make projects rapidly and durably required by the Department of Defense and the Atomic Energy Commission.
- Plant houses that are scheduled to be completed before or in 1952.
- Steel producing or finishing facilities scheduled to be completed by year.
- Important steel producing or finishing facilities needed to build weapons and

cores, generally scheduled to be completed during 1952.

In the Air Force view, the word "urgently" in the first criterion certainly must have been too strictly applied, because the AF has ordered about 9,000 applications, and NPA has turned down more than 4,000. But, probably, in the NPA view, the Air Force was a bit liberal in its endorsement. One auto motive company, for AF endorsement for about 62,000 tons. And yet fourth quarter steel total to all AF contractors was 51,275.

Research Not Ugly—That is some measure of the kind industry feels it is in because of the structural steel shortage. A case in point might be Boeing, which got an allotment in the fourth quarter having released last week. It already has started expanding its wood-based facilities at Seattle for research on the B-52. And at Wichita, Boeing needs an electronics building in connection with B-47 production. Both of these projects will have to be suspended unless a decision is made in the fourth quarter allotments, as Boeing managers were often very out. At a study now, both B-52 and B-47 work is subject to delay.

This had to be overlooked in NPA's damage up the allotments. That



FIRST PRODUCTION AERO COMMANDER BOLLS OFF LINE

Production site of two Aero Commander's work by November is expected at Tulare Airport, California City, plant by Aero Design & Engineering Co. First production could possibly come off the line, with for

more in the weeks behind it. Company took over an empty aircraft hangar at Tulare in January, 1951, to set up this plant and get it into the orders, with deposits, for 40 Commanders.

agency's explanation is simple. The fourth-quarter shipments are in the nature of a "rush" program. It has to be done right away. Research work can always wait, as the NPA sees, and that takes care of the windtunnel. As for Wichita, work has been done out of dates at Wichita before, and a few months more won't go to make a lot of difference, NPA feels.

Little More, More Later—NPA is an overstatement of the position of the man paying a lot of money from hand to hand until it costs. NPA defines some construction the military says is not in favor of construction that NPA wants in the long run is going to help use all available. As the largest allotment of structural steel in the fourth quarter—\$9,161 tons—goes to use and steel companies believe by spending the capital in their facilities you speed the day when there won't be any structural steel shortages.

By following this philosophy, NPA hopes that there will be more structural steel available next year.

Of course, the other result of steel philosophy is to delay the day when the Air Force will be the place and capacity must be built. It makes part of the future the date when the Air Force (particularly in reference to the B-52 and the Strategic Air Command) will be in a position to meet all its commitments.

More And More—All of NPA's actions are pitched on the policy of expanding the production base so that at some future date if the country did not become involved in a cold war in the near future—there could be a tremendous supporting of material. To meet military and industry policy in Washington who are important to get volume production quickly, that series is "open plus better" policy.

The finding a growing among military and industry policy in Washington that the Defense Production Administration is more advanced in having the curve of civilian output one parallel to the curve of defense production than it is in spending defense production share

So, while it's true that greater steel steel allotments may be used to make steel later on, that additional steel capacity will make possible a continuing high level of civilian production. Without the additional steel productive capacity, civilian requirements might have to be increased later.

But as it is extended crisis of its present policy, NPA's fourth-quarter structural steel allotments deal roughly with general commercial construction. Steel requirements in the category were 186,574 tons. Allotment in 12,075 tons, 11% of requirements. "Other industrial equipment" defined as industrial machine equipment, facilities, clean rooms, elevators, and additional equipment, pulp and paper, etc.—far from what better. Requirements were 161,315 tons, and allotments were 32,315 tons, 20%.

The allotment slides that of the Air Force and is considerably better than the 4,819 tons allotted to Army construction. (Continued on page 13)



SKYROCKET D-5161, New Douglas seventh craft which set new altitude record for one-crafting craft in Aug. 15 flight.

Details of Douglas Skyrocket's New Record Flight

Recent flight of the Douglas Skyrocket piloted by Maj. Bridgman showed every existing altitude record for occupied aircraft in history, the Navy has announced. Navy refused to give exact altitude although it is generally believed to have been 77,590 feet—over 14 miles. This is more than a mile higher than the officially recognized record of 73,334 set by a rocket-carrying balloon in 1933. Douglas, it is understood, set this "mile higher" goal as the last test of the Skyrocket before turning it over to NACA.

The 45-foot, two-stage plane was launched at 95,000 ft. after its rocket

fuel tanks were "jettisoned" from the mother ship D-20. In three seconds Bridgman said all four rockets went and started up at a 60-deg angle. Within ten seconds the plane had broken then the nose burner 1662 caught and was climbing away from the earth at a speed of about 1,000 miles an hour. Almost immediately Bridgman had to pull the plane into steep angle of climb to save power for climb rather than speed. When the Skyrocket reached its planned altitude, Bridgman leveled off to attain high speed performance data. After burnout, Bridgman glided down and presented

to make a perfect dead-stick landing. Douglas engineers and the plane could have gone higher on its Aug. 15 second mission but had the pilot been a "variable-lift" instructor, he might up. But Navy and Douglas spokesmen said they were content to break records gradually while proving maximum safety for pilot and plane.

Adm. T. G. Corbin, Chief of BuAer, said at conclusion of tests that such credit for Skyrocket's success was due directly to the personal effort given the program by E. H. Hennessy, chief engineer of the Douglas D-5162 Skyrocket.

(Continued from page 14)

test and the 7,300-ton approval for Navy construction. Both the Army and the Navy allotments are shared by the Air Force. The Air Force allotment is shared by the Army and the Navy. The Air Force allotment is shared by the Army and the Navy. The Air Force allotment is shared by the Army and the Navy.

NPA adds that additional testing will boost the Army Navy Air Force allotment to 60,000 tons, but that joint effort will get the Air Force allotment to 100,000 tons.

Included among seventh priorities allotted fourth-quarter structural steel are: Pratt and Whitney Aircraft, North American Aircraft, Ford Motor Co., and General Motors. Ford Motor Co. for an engine plant, Packard Helicopters, American Brake Shoe Corp., for engine facilities, DuPont Mfg. Co., for engine facilities, Lockheed, Ford Mfg. Co. for parts facilities, Thompson Products, Inc., Ford Motor Co. for an engine parts plant, Harco-Brydell Co., for engine parts facilities, American Machine and Tool, Inc., for aircraft manufacturing facilities, B. G. Corp., for aircraft engine components facilities, General Electric Co., for engine facilities, General Electric Co., for engine facilities, General Electric Co., for engine facilities.

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out and coordinate inter-service tactical ground support matters. Air Force at that time refused coordination and that Navy resigned post.

Initial More-Less Air Force, however, in the Air Force's view, are for tactical support in view of the international situation, finally set up a "field office" at Ft. Rucker, Army Air Force, which was supposed to be co-located with Air Force tactical matters. The field office was named by representatives of the Eighth Air Force group and North Western Air Force and supported with Army, but actually accomplished very little by way of sending a message to the Air Force. The primary reason it was an authority.

Army representative on the new Joint Tactical Air Support Board is Maj. Gen. William M. Miles, director of Air Force's airborne command. Navy has not yet named its representative but is expected to do so shortly, a Navy spokesman said.

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NACA Test Program Slashed by Congress

National Advisory Committee for Aeronautics' 1952 program for construction on test facilities has been cut 50% by Congress.

NACA requested \$13,900,000 for new projects for the '52 fiscal year, but Congress slashed it to \$6,950,000. The budget approved by Congress and signed by the President allows only \$6,950,000.

The committee has discretion as to how to apply cuts in its planned \$13,900,000 program, which was to include a \$2,000,000 program for the construction of the 7-11 by 10-12 tunnel and building addition to the 16th tunnel laboratory.

Army Laboratory, \$1,500,000 for modernization of the 6-B by 1-11 tunnel and test transfer and low-density apparatus.

Lowin Laboratory, \$1,000,000 for hydrogen liquefaction plant and high altitude flow facilities.

Wallops Island, \$100,000 for service facilities.

Edwards Station, \$4,333,000 for flight test facility.

During the year, NACA will also move forward with development of its plan of five new centers and several programs: two supersonic wind-tunnel facilities and 4-11 tunnel at Langley, and a 6-11 supersonic engine test tunnel at Lewis.

Under Congress' new \$75 million plan available to NACA, in some instances ahead with this program, of which NACA has obligated \$10 million. The program is that the tunnels will be completed in about two years.

In addition to the \$6,950,000 for new construction work, NACA's '52 fiscal year budget, as approved by Congress, shows:

For liquidation of construction contracts already let, \$14,000,000.

For salaries and expenses, \$49,216,000. NACA requested \$57 million to provide for 1,100 additional personnel to step up its activities to keep pace with the expanded military research and development program.

NACA's total appropriations for the '52 fiscal year of \$57,000,000 all cash, compares with the \$74,958,000 as appropriated the agency for the '51 fiscal year—\$65,068,000 cash and \$11 million contract authorization.

Quanta Airways Gets Plymouths

Melbourne—The first two of four Quanta Plymouths on order have recently been delivered to Quanta Empire Airways, which will use the four-engine flying boats on Pacific Islands routes.

variable-daily feed basis, which allows for long bombing off the 24 hours, preventing upset work. The heavy bombs prevented the jugs and were off-balance. When they exploded, all the blast and shock effect was absorbed in the ground and flew with no effect on reconstruction overhead.

► **Atomic Aids**—A new major use for medium bombers in attacks on all weather and at night against enemy troop concentrations. Borden and other major development aids and Shores recently made medium bombers in the bomb-dropping point. Against troops, the B-29 drop 100 and 500 lb bombs, with precision from, which burst in the air with devastating effect on enemy troops. The accuracy of the equipment is so great that these bombs are dropped at night within 400 yards of our own front lines.

Chemical factories have been targeted by this weapon. They believe our role actively picks out large concentrations. Industry, consequently, could use B-29 dropping, precision-based bombs with striking a full enemy industrial attack.

The B-29 is not considered the ideal aircraft for the job, but it is available in large numbers and it can do the job in the capacity of qualified aircraft. It is believed that the B-29 would be excellent for tactical bombardment.

► **Only the Air Force**—What observers believe is necessary now in addition to the Air Force Strategic Air and Tactical Air squad, together on the development of medium bomber units which can be switched from one station to the other as required by the military situation. The alternative is the utilization of air power by degree.

There also is a need to swing American military publicity from the big bomber concept to the biggest destruction concept. The number of airplanes, bombers, the number of strikes down, and the loss of bombs released are meaningless figures in war. Analysis of the great B-29 raids on Japan revealed that the first 35% of the planes over the target were accounted for 90 to 95% of the damage. Maximum efficiency would have been obtained by sending 200 plane attacks rather than 800 plane missions.

But in its battle for publicity with the Navy, the Air Force couldn't get the big play unless it sent large numbers of B-29s flying toward Tokyo. The big flying concept in the long run has a blinding effect on efforts in all services.

Finally, the Air Force, as well as all the services, needs to develop its own means potentiated through open-minded research and development of its methods of attack. The first step is to give examples of this war. Lt. Gen. Curtis LeMay's decision to send the B-29s

over Tokyo at 5,000 ft. altitude. Though late 1944 and early 1945 the B-29s dropped their bombs from high altitude with greatly increased results. Flak and enemy were disturbed when the briefing effect announced the altitude at 5,000 ft. for the Tokyo attacks of May 5, 1945. But the results were unimpressive and began the great fire raids which destroyed so much of Japan's principal industrial centers.

See Supersonic Jet Delta Flying Boat

Research and design details of a new flying boat configuration, blending aerodynamic and hydrodynamic refinements, were finished last week by Ernst B. Stent, assistant to Convair's

chief engineer, in a paper presented before the next conference of the Institute of the Aeronautical Sciences and the Royal Aeronautical Society, at Farnborough, England.

Stent's paper, "A Review of High-Speed Hydrodynamic Development," described to the third joint conference of the Anglo-American group the results of Convair's hydrodynamic experiments in Project Skate and its delta wing experience with the X-27.

During the work, Convair's engineers have produced data indicating that the aerodynamic advantages of the delta wing coupled with a new hydrodynamic concept of blended wing and hull design can lead to jet-powered, supersonic, water-based aircraft.

(Convair's X-27 will present further details of Stent's paper later.)



B-50 TAKES ON RESEARCH 'BOOM LOAD'

Troubled over the body of Boeing B-50 bomber ship, the tiny subcarrier-based X-1D (top photo) is prepared for flight. Just gone to mount launching, X-1D suffered a mid-air crash and had to be jettisoned, exploding in mid-air (Aviation Week Sept. 8, p. 15). Pilot had scrambled to safety before ship

burst of taking mother ship over jet containing X-1D jet attachment in formation, B-50 a short period above ground level loss. Lower photo shows X-1D bombed into mid-air crash of B-50, where it is carried in altitude and released. Differences from X-1 subcarrier launching canopy.

PRODUCTION



NOT A TOY but a production of the 141 sole model of Kaiser-Frazer Willow Run plant, with output of Packard C-119 on assembly line. K.F. President Edgar Kaiser (right) inspects 70 x 35 ft. layout with other K.F. executives.

Willow Run Getting Ready to Roll

Kaiser-Frazer expects to finish first C-119 this fall, with a 3-a-day C-123 peak rate after Packard phase-out.

By Alexander McFarley

Willow Run Airport, Mich.—As one of the best laid-out aircraft manufacturing facilities in the world, Kaiser-Frazer Corp. is getting ready here to build two-engine transport aircraft in a plant which may eventually take three places a day, under present plans.

About half of the huge aircraft plant is at present assigned for plane production while the rest of the 9.5-million sq. ft. facility awaits for continuing automobile production.

Schedules call for the first Packard

C-119 transport cargo transport to be completed at Willow Run this fall, probably in November. As noted, the first several of the launchers' phase will be assembled from parts largely supplied by the parent company, Packard Engine and Airframe Corp., from its Highways-Mid. plant.

Later Firms—It is soon as its own production gets rolling, Kaiser-Frazer hopes to increase production of the Packard gradually up to beyond the 20-a-month figure at the peak, before production is phased out for the C-119, and phased in for the second plane to

be built at Willow Run—the Chase C-123 assault transport.

Plus is for the Willow Run phase-out of C-119s to be completed with the closure of the Packard production by Packard, in the plant operated by Douglas as World War II at Chicago's O'Hare Airport.

Kaiser-Frazer will build the C-119 fuselage and outer wing sections out to the nacelle at Willow Run, and is subcontracting production of the outer wing panels, fuselage, and tail to Gibson Refrigerator Corp., Greenville, Mich.; Whittell Corp., LaPorte, Ind.; and Murray Corp. of America, Detroit.

On a percentage basis it figures out that Kaiser-Frazer is building 55% of the airplane, after the first two weeks, and that some 70% component in 30 weeks are being used in supplies of the remaining parts and the materials.

► **Plenty of Doors**—Actually the Packard production at Willow Run will be small portion of what is being done at the same facility at World War II. The C-123 production schedule to follow will be a more complete utilization of the big plant's complete potential. Kaiser-Frazer plans to start the C-123 line paralleling the C-119 line as soon as necessary tooling and forms can be prepared, and after the C-119 line is phased out, will switch that line to a second C-123 assembly setup.

With C-123 orders totaling 40,000, 180 airplanes to be built at Willow Run, and with two lines on which to build them, it is estimated that peak production of as many as 100 airplanes a day may be achieved. This is still considerably short of what was done at Willow Run by the Ford Motor Co., its original owner, during World War II. Ford built a total of 4,500 Convair-engine, four-engine B-24 Liberator bombers and finished out 4,600 of these in one year (1944).

This breaks down to over 16 planes a working day. At the peak, stream only for a short period, Ford was completing one Liberator an hour.

Probably the best proof for comparing the new planned production at Willow Run with that of World War II is in airplane production. The C-119 airframe weight is about 27,000 lb. and that of the Ford-built Liberator was similar. The C-119 is somewhat lighter, probably around 20,000 lb.

Airframe weight is defined as the weight of the empty airplane minus powerplants, wheels, tires, landing, nose, fuselage, auxiliary powerplants, reversible radio and electronic units, armament, starters, generators and batteries.

► **Machine Tools**—Kaiser-Frazer is an industry giant when it comes to plant production as far as general purpose machine tools are concerned, but will need special purpose tools. Some other the automobile company knew it had

the C-119 leasing agreement fixed up with Fairchild and AMG, its tooling equipment was sent down to Marietta, Ga., to select large quantities of general purpose tools from the Air Force reserve storage. They got in early enough to get excellent tools. These tools already have transferred to Willow Run, and are being placed according to a very elaborate and model production layout which Kaiser-Frazer has laid out on a balcony overlooking the production area.

Eliot Kaiser, president of Kaiser-Frazer, says that his company is now running out 200 automobiles a day at Willow Run, a considerable drop from the peak production of 2,293 cars a day that he expects the aircraft production to about equal in some production, in dollars, by about May of 1952, when the peak order program schedules will be reached.

OUR EXPANDING INDUSTRY

AC Spark Plug, division of General Motors is preparing to tool up at Flint, Mich., for production of geysonic sparkplugs for the USAF.

Affiliated Mfg. Co. of Avionics has started assembly operations of electronic analog computers and other precision

instruments in its new 70,000 sq. ft. plant at Sky Harbor Airport, Phoenix. The plant now employs 170.

American Brake Shoe Co. will build a factory at Midland, N. Y., to produce parts for Wright Aeronautical Corp.'s J-45 Supracat turboprop engine. The factory will be ready in the spring of next year and will be operated by the company's Engineered Castings division.

Baldwin-Lima-Hamilton Corp., Eldersville, Pa., has gotten a contract from Wright Aeronautical Corp. to manufacture turbines for the J-45 Supracat jet engine.

Collins Radio Co. will lease a \$2,000 sq. ft. area, to be built in the Trinity industrial district of Dallas, Tex., located near the firm's present 20,000 sq. ft. factory in that area. Collins is working on a backlog of over 5119 orders.

Cowens's Guided Missile division is expanding its Phoenix manufacturing facilities by 15,000 sq. ft. Division is also leasing nearby vacant storage lot to provide temporary additional engineering laboratory facilities.

Fox Edge Co., Inc., Lowell, Mass., has recently completed an expansion of its production and productive capacity

which will boost output 100%.

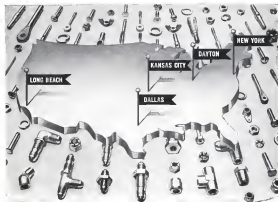
Humphrey, Inc., San Diego, has become affiliated with Pacific Scientific Instrument Co. to take over the design, development and production of astronomical guidance and control units of Humphrey-Watson Co.

Ludkeheed Aircraft Corp. will open a 45,000 sq. ft. factory plant at Bakersfield, Calif., for subcontracting of subassembly of fuselage and control units of the company's planes. The plant, which will be in operation in 60 days, will employ 250-300, mostly women.

Metal Processing division of Carter-Wright Corp., has acquired the Otto Elevator Co. works in Buffalo, N. Y., having 114,000 sq. ft. of building area. Division will work on advanced metallurgical techniques to be used in the production of jet engine parts.

Neonath, Inc., Los Angeles, has doubled capacity to produce electronic components by moving to larger quarters at 11632 San Vicente Blvd., Los Angeles 45.

Majestic Aircraft division, Metal Structures, Inc., Norwalk, Conn., has contracted with Glenn L. Martin Co. to build aluminum for the P5M-1 Mustang flying boat.



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Temco Speeds B-47 Work Along the Right Track

More production speed and conservation of vital needed floor space items from an elevated track arrangement to facilitate equipment installation in Boeing B-47 jet fighter sections being built by Temco Engineering and Mfg. Co.

Temco engineers designed this production facility as a substitute for elevat-

ing each fuselage section in its own jig consisting of two scaffold-like stands situated to each end by support rails, then mounting the entire jig on wheels in order to facilitate movement on floor tracks.

In the new arrangement, the scaffold stands have been elevated and the wheels have been welded directly to the

jig support rails to support the sections on the double dented track, allowing close grouping of units.

Preference also was introduced which could be suspended from the support rails and major fittings or mounted on the track along which the fuselage sections travel. This eliminates bulky floor work stands.



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USAF CONTRACTS

Air Force contracts awarded by Air Materiel Command for the week ended July 27 included 133 valued at over \$159,800. In this issue, Air Materiel Command lists the buying agencies last week.

Alameda Park, Inc., Los Angeles, awarded sub-aquatic projects (C 27A, over \$10,000).

Albuquerque May Co., Inc., of Garrett Corp., Los Angeles, spare parts for engine, engine, accessories, (C 39C, 318 items, 100,430; engine, engine, 100,430; engine, engine, 100,430).

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one of Magnusson's that the new plant
will allow its own important economies
and control factors—ability to sell exact
parts and gages needed for fabrication,
rather than being dependent on limited
stock sizes available. This frequency
analysis is much as 50% waste is not
being the required blasts.

Operation of the company-owned
facility will largely eliminate delay or
waiting from short supply of accessories
short. This has been in process, M&P
says, that current delivery of certain
fabricated parts are held back several
months.

The new plant will be located on a
10-acre site in the northwest suburban
area of Detroit. Contracts for the first
building already have been awarded.
Most of the heavy equipment is on
hand and metal extrusion will be in
place a hot wall and two cold walls,
with more and modern equipment.

Rolling operations in this facility are
expected to begin next January. Plans
call for integration of all half operations
in this area, but eventually
fabricating will continue in the state
plant near downtown Detroit.

Impact-Extrusion For Thin-Wall Parts

A team of Lockheed Aircraft in-
structors have come up with a scheme
for impact extruding tough aluminum
alloys, in process widely used with soft
materials.

Experiments and actual production
in the study of adapting the process to
metallic materials have already brought
in the design of a 1,000-ton impact-ex-
trusion press. It is now being
built by E. W. Bliss Co., and will be
installed at Lockheed this summer.

Already considered for processing by
the method are 15 parts, whose transfer
from conventional machining is ex-
pected to show a saving of more than
55,000 yards. Four of these parts
now are in production on a smaller
press. Engineers predict that the
process, most practical on a maximum
quantity production of 1,000 parts, can
be extended to 177 different items for
large economy.

Lockheed fabrication engineers feel
that extrusion opens new design fields,
enabling reinforced shapes that previously
were prohibitive cost-wise, with its in-
crease in tensile strength over machined
parts because of the cold working that
the extrusion process to the metal. And
thinner reinforced parts can be produced
with consequent weight saving. Saving
of material also will be effected in these
parts inductively made by heating, drilling
or cutting.

On the new Lockheed press, flow rate
will be two parts per minute with hard
alloys, 12 per minute with aluminum
alloys.



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AERONAUTICAL ENGINEERING

How GE Tested Ramjet for Helicopters

Data gathered proves importance in light of increasing interest.

Enthusiasm on the ramjet and pulse jet seemingly has been sub-pulsed, publicity-wise, in comparison with the mass of data published on the top rotary subject.

These propulsion engines were brought into the picture early by World War II. The ramjet seemed only found widespread application in the fixed wing field, while the ramjet and pulsejet were applied only as a limited scale to the propulsion of guided missiles.

But helicopter engineers soon saw the potential for the ramjet and pulsejet in the rotary wing field. Definite advantages were reported shown for the former in McDonnell's Little Hawk (GXH-30) and the Hiller Hawk and for the latter in American Helicopter Co.'s Top Sergeant (XAH-1). The ramjet, too, has needed the center field. It is being evaluated in the Hughes XOH-17 and the French Aérojet S. O. 1120 (OH-10).

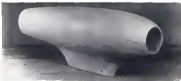
Powder Ramjet—One of the pioneers in ramjet studies was General Electric's general engineering and consulting lab. This facility, as far back as 1945, designed and built the SR-1, a 6-in. sub-sonic, constant, which was tested on the tip of a helicopter blade. The investigation in its major part was under the auspices of U. S. Army Ordnance's Project Helios.

The engine's outline and its performance data were presented last year at the Sixth Annual Forum of the American Helicopter Society by Igor S. Benisek, now chief of research at Kaman Aircraft Corp., and formerly with General Electric Co.

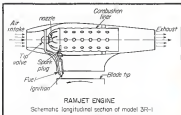
Benisek's paper has not been previously published, but the data is as timely now as when presented—particularly in view of the accelerated interest in jet power for helicopters, an era that is just beginning.

Investigation with the SR-1 engine proved that a subsonic inlet drive is a suitable and attractive thermal powerplant. Although no production model was planned, enough was learned to give weight to larger models and higher speeds.

Prospects Good—Benisek holds that



Life model of GE SR-1 engine.



there is little doubt that a self-contained powerplant of ramjet type will gain widespread popularity in the rotary wing field in the medium-distant future because of its basic simplicity and low cost.

It will come to pass as soon as more knowledge on engine mechanism is disseminated to engineering groups of experimenters and inventors.

In view of the engine's fuel economy, it appears that it is most suitable for short-haul operations, cruise in passenger, as well as for personal flights of about one hour duration. On that basis, Benisek says, it will out-perform in economy the conventional piston engine by a long margin, both in initial cost and in operational expenses.

But there is still much room for improvement for the ramjet engine. It now is overpowered with the pulsejet for use which will make the entire self-

starting. Cheaper fuels, such as fuel oil and coal, are very much on the picture, for there is no theoretical limitation in their use.

General Characteristics—The SR-1 engine was basically built entirely of stainless steel. It consisted of a thin outer shell housing a domed, perforated cylinder with fuel nozzles and sparking in its head, similar to the combustion chamber used in the turbojet.

The engine was originally designed for operation at 250 ft., when it would deliver approximately 50 hp. at a specific fuel consumption of 3.3 lb./hp. hr. Later aluminum model weighed just under 5.0 lb., giving a specific weight of 2.1 lb./hp.

Commercial grade kerosene was used for fuel throughout the tests, although on some occasions ordinary automotive gasoline was substituted, with only a slight gain in performance. Diesel oil

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and light grade fuel oil she were based with good results.

Performance. Operation-Benson reports that one of the main purposes of the development program was to develop a satisfactory thermodynamic theory of target power cycle which would be verified by tests and measure merits of actual engine behavior.

This goal was substantially accomplished, for the agreement between theoretical and measured performance figures was within 5% or better, throughout the range of tests. An accompanying chart is a comparison of engine gross thrust and specific fuel consumption vs. tip speed. Thrust is three curves at actual force available for acceleration and, therefore, work. It can be plotted as rotor horsepower vs. tip speed, as also shown in more convenient form for rotary wing engineers.

These curves show that high tip speeds offer the most favorable regime for engine operation, for its thrust output varies nearly as a square of relative free stream velocity. Thus, for a given rotor, the range of power available for thrust is always greater at higher tip speeds, other factors being equal.

This must be balanced by an accompanying compromise against higher blade passing drag, heavier blades designed to withstand greater centrifugal forces, poorer rotor controllability and, perhaps, the counterweight of compressibility effects at high tip-speed ratios.

Of further interest is the apparent peaking of the thrust curve through the regime. So does the drag of the rotor at stallable, but it is shown less than the net thrust. Why then, power Benson couldn't the steel drives rotor be started without auxiliary power? The graph suggests the answer: (1) May be thrust over drag is infinitesimal near zero speeds and (2) the approach is less, in this regime.

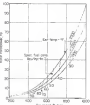
On the practical side, at low tip speeds cavitation phenomena should be kept low (higher rotors available thrust) because insufficient external loading increases the danger of over heating the turbine. Then, it is generally necessary to accelerate the rotor up to 180-200 for the external power be for the rotor built take over.

Tip Temperature. A typical curve of thrust coefficient vs. fuel flow at 100 ft/sec tip speed is shown related for several test cases. A cross plot of net temperature is unimodal for a more complete picture of performance.

Insistence of power choice of exit gas can be seen from this diagram. However, that exit temperatures will be limited by the fuel and not primarily by the combustion efficiency. There is a delicate balance act now which will tend to prevent thrust coefficient and found fuel flow for a given exit temperature. However, here, too, a compromise



Jet thrust vs. tip speed.



Rotary hp vs. tip speed.

must be taken, for normally, the net rotor output will operate through a range of exit temperatures, depending on power demand. Thus, a selected design point may be 2200° with a speed of ± 300 deg. to accommodate normal power variation.

The thrust coefficient curve is curves upward, leveling off at stallable speeds, but also reaching its drag beyond this point. This suggests an interesting way to analyze compressors—that which must be taken to accommodate for varying tip speeds. While it is relatively simple to find optimum power setting for one given rotor type, as altogether different problems is presented by the variation of tip speed due to forward flight.

Rubine has stream velocity fluctuates cyclically with per revolution whenever the rotor possesses translational speed. It seems fairly hopeless, says Benson, to attempt to use the fuel flow in connection with the rapidly changing stream velocity—because of "water hammer" and many other undesirable effects in fuel lines—hence, a more fundamental method of compression must be sought.

Engine Size. The complexity of the thrust coefficient curve suggests a solu-

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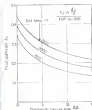
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Thrust coefficient vs. fuel rate



Thrust coefficient vs. pressure drop

how to this problem. In selecting engine size for a particular rotor velocity, drop in speed of, say, V_1 , a certain maximum forward speed, V_{1m} , must be contemplated. Maximum rotor velocity on the advancing blade will then be $V_1 + V_{1m}$, while minimum of $V_1 - V_{1m}$ will occur on the retreating blade.

Engine size then should be so chosen to deliver rated thrust at fuel flow per unit of discharge, at tip speed of $V_1 + V_{1m}$. With this observed, the advancing blade will be operating at a low reaction and, therefore, at a reduced thrust coefficient. But, since its rotor velocity is $V_1 + V_{1m}$, and it enters into the equivalent of thrust at square base, its effect can be greater than that of lower C_t .

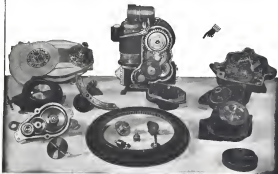
In fact, Beason holds, with proper care it is not difficult to design a compact engine for a given rotor which will have greater thrust on the advancing blade than on the retreating side. This is something new in the rotor wing set. Of course such a rotor may not require big lengths and will be very compact in forward flight.

► **Pressure Drop—Another plot** shows influence of pressure drop, Δp_0 , in the combustion chamber, on the gross thrust coefficient. This, Beason advances, is a very important criterion of overall combustion chamber efficiency in engine design. It is usually selected to as deep as "velocity head" at more rotor diameter, except carefully by the

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overall drag of the burner during the combustion process.

Manufacture loss, due to temperature rise of gas within the chamber, is not included in this figure, because it is small, readily calculable and is the same for all burners, regardless of design, as long as they reach equal combustion temperatures.

It can be seen that the thrust of an engine may be doubled by reducing combustion pressure drop from 12 to 1 subjects heads at 13000, for example. In making this drop, some sacrifice in combustion efficiency can be inevitable—say, from 95 to 80%—but it is usually more than paid for itself in reduction of gas-side drag by permitting the use of smaller size engine. Arriving at an optimum balance in this choice, says Sereno, may still be regarded as one of the least of aircraft development and, indeed, presents the greatest challenge to engineering skill.

• **Fuel Control**—There are a number of other pertinent problems which must be solved before the aircraft engine will successfully operate. Fuel metering then is fuel control. A fuel reduction will bring out the realization that the necessity is a centrifugal pump, increasing fuel pressure at the tip to as high as 2000 psi, depending on meter rpm. The higher the rpm, the higher the pressure, which in turn tends to increase fuel flow, thereby increasing rpm—a dangerous feedback, threatening to cause meter run-away. Something must be done, controls Sereno, either to make fuel control immune to changes of rpm, or to actively to reverse the response to provide automatic governing action.

This was successfully done by means of a "tip bleed" which is almost a pressure relief valve in that it is the weight of its plunger under centrifugal force opposes the hydrostatic pressure of fuel in a controlled manner. Care must be exercised to prevent valve chattering, hunting, etc., throughout full range of rpm speeds and fuel flow. A fair amount of high grade engineering skill is required to have this development in function operation.

• **Weight Factor**—High centrifugal force, engine rotation No. 1 and only to fuel control, but to meet everything in the aircraft engine. At 6000 rpm, for example, centrifugal loading is 1000G on a 12 ft rotor. Thus, rubber seals turn of the ignition valve extend at will along the blade, it supports itself at the hole is over a foot in length. It must be taped in glass along its full length. Reduction of engine weight becomes an almost obsession of engineering effort.

While early models of J85 engine, entirely of stainless steel, weighed 134 lb, the latest version weighed only 49



ROBESCOPE view shows number of the expanding flame from turbine.

lb. Except for its 15.5 inch, it was all aluminum. In spite of extreme combustion temperatures, the aluminum turbine stood up well under all normal operating conditions, unusual as it may seem. The accompanying photo reveals how it was done. This picture definitely was taken at excessive fuel flow to show the effect of "film cooling" to protect the aluminum skin with a thin layer of cool air. Naturally, flame cannot be seen outside the exit nozzle.

Performance of the engine was also tested in low methods.

• **Static Bench Tests**—These were previously useful in combustion chamber development and qualitative description of system characteristics, flame blow-out, etc. But temperatures in an actual engine were continuously measured. Only internal air flow was applied to the engine which simulated hot air velocities up to 500 ft/sec. Later, the engine was mounted on turbo-propeller shafts, which permitted measurement of drag and thrust.

• **Windtunnel Tests**—These were conducted to measure aerodynamic characteristics, which cannot be well accounted for in stationary, burning tests. No combustion tests were possible at this time, but there were no windtunnel available with a vacuum exhaust system, oxygen content in these would soon drop down to a prohibitive level, and through-ventilation simulation would be of little value. Thus, no attempt was made to burn in the windtunnel.

Of great interest were drag and lift measurements, says Sereno, when the jet was run given positive residence time in the throat to simulate effects of oblique blade attack.

A value for L/D as high as 7.0 was measured in these tests, indicating that considerable lift would be produced by the jet body itself. The "body" drag coefficient at zero incidence was 0.11 while "body" external C_d was 0.06. The latter figure was obtained by fairing out the nose and tail to simulate essentially laminar external flow. With no based air flow equation, it represents per unit the friction drag.

Drag produced by internal flow (skin

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Flexibility is retained under temperatures below -100° F. and these pods will not crack when heated moderately. The entire thickness does not exceed .050. Nominal heat output at 450° F. is approximately 4 watts per square inch. Higher wattage densities may be used provided the surface temperature of the element is kept below 450° F.

The elements shown here were developed for heating the olefinic aircraft doors of the jet engines used on the S-36 airplane. In this application the elements are sandwiched between thin aluminum plates to form a part of the door assembly. Other aircraft now include the design of missile doors, helicopter blades and antenna bases, as well as heating of oil vent lines. The ability to make these pods in a wide variety of shapes to meet specific design requirements greatly extends their field of application and utility.



The jet engine pods of Cohrlastic elements are used to heat the olefinic aircraft doors of the jet engines used on the S-36 airplane. In this application the elements are sandwiched between thin aluminum plates to form a part of the door assembly. Other aircraft now include the design of missile doors, helicopter blades and antenna bases, as well as heating of oil vent lines.

SEE SKETCH AT LEFT

1. The olefinic aircraft doors of the jet engines used on the S-36 airplane.
2. The olefinic aircraft doors of the jet engines used on the S-36 airplane.
3. The olefinic aircraft doors of the jet engines used on the S-36 airplane.
4. The olefinic aircraft doors of the jet engines used on the S-36 airplane.



THE *Connecticut* HARD RUBBER COMPANY, 411 EAST LEBAN, NEW HAVEN, CONN.

How EDISON Indicators Save 35 Pounds



EDISON electrical resistance temperature indicators were recently specified for cylinder head induction on a new type of boat engine engine. In this application, two dual indicators and eight bulbs were used... in a weight saving of 35 pounds under the thermocouple system formerly employed.

Weight economy is only one of the many features associated exclusively with EDISON instruments. Of special interest to maintenance engineers is the ability of Edison indicators to adapt themselves to any temperature measurement application. The Edison instrument movement is provided for all indicators whether used for cylinder head, oil, air, bearing oil, etc. This adaptability permits the instrument made to any given industry to be changed easily by substituting a new dial and a few low cost resistors.

It will pay you to investigate the proven way to save weight and cut maintenance costs. For complete information on indicators, send for our new Bulletin # 3821. And for matching resistance bulbs, ask for Bulletin # 3015.

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"Bob" could not be well measured in the windtunnel without some complex addition of separate air jet into the combustion chamber. Instead, its presence was accounted for as a negative component in the thrust coefficient when measurements were conducted in jet thrust with burner actually firing.

Electric Dynamometer. The setup served two major purposes—to measure actual power output of jet under operating conditions, and to check various factors of safety by overloading the rotor. The dynamometer, capable of delivering and absorbing 350 hp up to 500 rpm, was mounted inside a 4 1/2-in. dia. pot, with its shaft vertical, so that magnet engines were skidded on blade tips in the horizontal plane.

Fuel was fed and controlled from the top of the cover which confined the jet. Although jet power output measurements were not very accurate with this setup because of unaided air circulation within the pot, which decreased relative air velocity in some circumstances, the value of this arrangement was considerable.

Effects of centrifugal force on fuel control, flame symmetry, ignition and blowout characteristics under actual operating conditions were studied with ease and speed because of the setup's excellent flexibility. Comparative data on thrust output were available at all times on the dynamometer instruments.

A thorough vision-jug instrument was not installed, making possible observations of actual analysis studies and serving as a safety feature in emergency tests.

A very costly speed device, the Rotameter, was installed and tested here for the first time. In nature of a system of revolving mirrors, it permitted continuous observation of blade tips. Flame shape and color could be watched against all rotor speed and backgrounds of illumination of the field. A *Outdoor Truck*. As a final step, the magnet engines were mounted on blade tips of an actual aircraft and whirled within through the range of its speeds. An old Kellert Y20-60 magnet served as an early test rig for this purpose. Power input and output could be measured within 1% by an electronic transducer mounted on the *rotameter*. Fuel, ignition, thermocouples, etc., originally were fed from above, by means of an overhead beam. A scaled 24-gauge shipping container served this purpose faultlessly throughout the program. Fuel, fuel and gas jets were fed from below and through the hollow hub as in an aircraft installation.

Overall Characteristics—A large number of observations were made. Some of these are:
Initial cost of a setup is, obviously, (Continued on page 147)

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COLLINS Radio Company is now giving *demands* within of a revolutionary new Flight Instrument System to airline pilots and scheduled passengers from coast to coast.

The purpose of the System, which has been under development and flight test for some months, is to give the pilot a clear, *positive* indication, on fewer instruments, of all the information he needs for precise ILS approach flying and on some approach. Only four instruments are required in the basic flight group designated above — the new Collins Approach Indicator, the Course Indicator, conventional altimeter and conventional air speed indicator.

Although complex VHF navigation and instrument landing information is supplied, the pilot on only two in-

struments, there is no possible source of confusion. Rather, there is a quick, correct perception of the aircraft's exact position with respect to the selected course, and easily followed steering directions for making good the course.

Having copies of all the Collins Flight Instrument System has over 100 pilots to whom it has been demonstrated (for example, one said the System seemed "— approach, no doubt, and modified confidence. Another said, "You don't have to keep looking back and forth between the ILS indicator and a separate gyro horizon. Almost without exception the pilots feel that integration of most information on fewer instruments is less confusing, more readable.



Collins Approach Indicator



Collins Course Indicator

The Approach Indicator, pictured above, in addition to showing altitude in an "altitude" instrument. It tells the pilot (1) he is on course and steering correctly to arrive vertically on course, or (2) he is on course and steering correctly at 400 ft in an instrument flying in a manner that won't keep him there. Thus, on final approach the single instrument presents all information necessary for making an accurate ILS landing without looking for the clear course or maintaining velocity to get on the runway, also break through.

The horizontal bar of the Approach Indicator operates much the same as a standard altimeter. Peak information is shown by the highest wings and line of the airplane in the center of the instrument, which move up or down independent of the vertical change.

Deployment instruments with respect to the glidepath is obtained by noting observation of the pointer to the left in relation to the 5-5 scale.

Electrically actuated steering information for making good the heading course represented by the pilot by left or right deflection of the vertical pointer. To make good the course it is only necessary for the pilot to maintain the heading (which the pointer controls). This is automatically compensated for by keeping the pilot on "auto" in order to keep the pointer centered.

The Approach Indicator says that he need no great advantage in flying complex landings.

The Course Indicator provides the pilot with a clear picture of his position with respect to his chosen course, just as though he could see his course

in a hand where he needed on the ground before.

This single instrument is shown to the pilot at a glance all the information which ordinarily must be verified by evaluating the readings of several other instruments, which the Course Indicator makes unnecessary.

The aircraft's compass heading is displayed continuously against the ladder line in the top of the instrument.

Deployment information with respect to a selected course, or heading course is shown by the relative position of the small white airplane in the hand where bar which represents the course.

To show information with respect to an emergency system appears in unit 1 where flag on the approach side of the indicator is on.

Thus, the Collins Flight Instrument System displays no more than a system which shows all necessary information for precise ILS approach flying, altitude, heading and steering information.

Adoption of the Collins Flight Instrument System will replace each of the instruments in the conventional flight panel and eliminate special efforts. The combination of the great circle, course and altitude, if correct, but more important, presents in the pilot all the necessary information, more clearly, in fewer instruments, and in a manner that requires a minimum of interpretation.

A further discussion and describing the operation of the Collins Flight Instrument is also available. We will be glad to mail you a copy on request.

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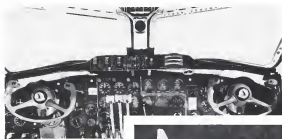
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High strength, high heat seals of Pittsburgh Plate Glass are used in connection with the extensive duct system in the installation of the C-125 "Blender" built by Northrop Aircraft, Inc., Hawthorne, Calif.

On Northrop's tri-motored "Raider"



A "Raider" (Northrop Model 412) is shown here installed in a simulated cockpit scene.

Safety Glass

BY PITTSBURGH

Designed for both military and commercial use, Northrop Aircraft's C-125 "Blender" brings back the tri-motored transport so familiar to aviation's early days. The "Raider" is a heavy, rugged plane, designed for use in small or high-altitude landing fields.

In line with the "Raider's" overall rugged construction, the windshield includes panels of high-strength, high-impact Pittsburgh Plate Glass. Several used in connection with a vent-air clearing system. Floor-to-ceiling glass and special windows with a high degree of resistance to heat impacts.

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PAINTS - GLASS - CHEMICALS - BRUSHES - PLASTICS

PITTSBURGH PLATE GLASS COMPANY

(Continued from page 40)
very low compared to a reciprocating engine, depending on the winding giving the latter impetus. There are very few close tolerances to be kept, if any.

Nonetheless, Benson uses a direct non-contact—there is no lubrication system to attend and no moving parts to wear.

Every 25 hours or so the burner may be subjected for carbon deposit, and may need occasional cleaning in the sense of jet engines. Carbon is usually soft and can be wiped off clean with a rag without removing the engine from the blade.

Noise level of the burner is considerably lower than that of its open-loop piston engine. In fact, it may be described as a low frequency buzz at 45-70db; if, by proper design, no flame pulsation is permitted to occur.

On numerous occasions during the development program, flame pulsation did occur, which Benson, with various degrees of modulation. Irregularity was accompanied by an increase of thrust output and the rise of noise level.

The pre-pulsant like behavior, in part, at least, is a result, but its operation was erratic. Several "overruns" could be obtained, by varying top speed and air-fuel ratios, each having its own specific performance pattern. Until now it is known about the control of this phenomenon, it is deemed advisable to use clear of pulsation altogether for the sake of uniformity of engine performance.

Power Failure.—There is some concern among design engineers as to what happens when power fails. Automation is considerably required by the drop of a "cold" engine, and this means the making good of the error, which already is likely to have fairly high disk loading.

This looks bad at first, says Benson, but, it should be remembered that there is an engine on each blade—two for two-bladed, three for three-bladed rotors. The risk actually has little engine performance. Chances are that level flight can be maintained on the remaining power, at moderate speeds, and safe landing may be accomplished with a slight flourish.

The rotor goes out of balance somewhat, due to dissymmetry of diving torque, but the amount of actual pitch vibration is insignificantly slight, particularly if lag torque are not used. Resetting of an engine is done merely by pushing the up/down button.

Starting Problem.—Starting the rotor from standstill must be done by auxiliary power. This is the second major drawback of a concept, although not an insurmountable one. Either a small gasoline engine or an electric starter



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can be used, and their power capacity should be between 1 and 2% of the total static horsepower, with an operating cycle of not less than 1 hour in duration.

One idea is to use auxiliary projects at the top to characterize growing and weight of construction material. This may be the answer, says Brown, but at present those don't start very early either. The future will show which method will receive the greatest strong action.

Engineering Groups Plan to Join Forces

Plans are underway to bring 40,000 50,000 engineering engineers in the U. S. under a single national organization which would speak for them on matters of labor legislation, wages and hours, and various professional and self-help issues.

Many of the engineers who would be affected are employed in the aircraft industry.

In an initial move toward such a national organization, officials of 16 groups, who as spokesman said, control about 25,000 professional engineers, held a meeting Aug. 15-16 in New York, N. Y.

Those represented were reported to have included the Minneapolis Federation of Professional Engineers, Engineers, Assoc. (Sperry, Gyroscopic group), Coast oil of Western Electrical Technical Engineers, Engineers and Architects Assoc. (Lockheed and General), Assoc. of Professional Engineers (American), IAC, and the National Professional Association of Engineers, Architects and Scientists.

The last named was described as one of the largest forces in the construction union. It is said to represent almost 1,000 West Coast engineering companies in Boeing Douglas and other industrial organizations and in civil service positions.

At the New York meeting, the purpose of the national organization was projected to promote the professional and consumer action of the engineering employee.

Plans were advanced for making of membership provision before the Wage Stabilization Board again discussed, wage data circulated between the 16 groups, and professional qualifications of engineering college graduates (for higher standards) was also an item.

The spokesman said a second meeting of the 16 groups, plus additional units, is scheduled for Feb. 22-24 at Chicago, when it is expected that a constitution will be presented for the projected national organization of engineering employees.



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EQUIPMENT



SPECIAL APPLICATOR Mists VPI into PAA engine for long-term protection.

VPI Joins Fight Against Rust

Anti-corrosion powder reaches market after extensive airline tests point to savings in time and money.

By Scott H. Roszelle

Large savings in time, labor and costs and reduction in the number of parts lost each in the fight against metal corrosion are predicted for VPI 200, a newly placed in the market by Shell Oil Co. after extensive airline tests.

The product is a white powder that provides corrosion-inhibiting vapors. Getting maximal attention in the aviation industry, it already is used in a standard, previous test, throughout all three divisions of the American War Reliance for production of engines (aircraft and auto) and components in storage or shipment. Other airlines that Shell has already adopted it for similar use are United, All American, Colonial and Capital.

► **Properties**—VPI 200 powder is a synthetic organic chemical compounded by Shell Development Corp. Its action is gradual in character, it does not penetrate into the vapors of VPI as caused by corrosion and diffusion to all surfaces of the part to be protected, where this tendency to give a thin layer of crystals which dissolve in any water like present. The important thing with use of VPI is that the surface does not have to be

re-treated to be protected. Unlike grease and oil coatings, VPI does not exert a protective wall of defense against any corrosive atmosphere. It continuously releases at the surface, during the life of the engine, in order to avoid the over-lubrication of the oil and engine running errors.

VPI can be applied in many different ways. Shell says. The powder can be blown down on engine in gas oil fumes during repairs which do not affect operation in time to be removed when the engine goes into service. Parts to be exposed to the elements can be wrapped in special paper impregnated with VPI, instead of being coated with grease and then laboriously degreased. All that is needed is to apply them for seven to ten minutes. The VPI vapors will prevent corrosion. Shell says, even if the package is broken.

VPI will not be used in a corrosive design on a metal surface or grease might be in addition to preventing corrosion, the product is said to have the capacity to completely resist corrosion at all stages.

► **Long Term Protection**—Where some methods of protecting engines are effective in terms of costs for a few months, Shell claims that VPI can give protection

time for years. And the protection goes on during the longer period a more effective, the firm stresses. Further, VPI will penetrate to surfaces of assemblies that cannot be protected by other means. An important feature of the product does not offer protection at temperatures above 140°.

VPI has been under severe tests by various companies since 1946 but only recently was offered as a nationwide basis by Shell. Previous to these tests, in the aviation industry, only Pratt's Pacific Alaska division, PAD, had developed standard procedures for protecting its engines and other parts with VPI. So far, it has treated about 170 Pratt & Whitney R-2800s and 158 R-2800s and stored them with increased safety in such highly corrosive atmospheres as around Wake Is., Guam, Manila, Noumea, and Bangkok.

► **Pratt's Experience**—PAD said that before using VPI, it had to perform overhauls on five R-2800 engines that had rusted while being stored at bases along the company's routes in the Pacific. Approximately eight P&W R-2800s would be overhauled without ever being placed in use, in a very real sense. Since using VPI, the company commented, it has not had a similar experience.

Before VPI came into use, PAD treated the natural engine with AN-VV, -C-5780, Type 2 corrosion-proof oil. The outside of the engine was sprayed with hard setting AN-C-52 compound.

Now, the outside of the engine simply is wrapped in VPI paper. This results in treated both by surface and oil and VPI. The powder is blown into each cylinder, the main, power, blower and sea sections. For added protection, the cylinders are fitted with "Protect" plugs. Shell said, VPI will not affect any steps of the paper also are placed between cylinders and pistons. Further, he developed a special application for blowing VPI into the engine.

► **First Tests**—PAD first became impressed with VPI's potential in 1945 when it put small quantities of the powder in plastic bags containing iron and engine parts and instruments and left them on the roof of a hangar at the company's headquarters. Some five months later, the test led to a definite conclusion.

Experiments were carried out to determine optimum procedures for storing engines with VPI. Other tests established in the laboratory, Shell Development Corp. proved VPI does inhibit sufficiently of engine operating temperatures to preclude any need in sealing of parts. It also was found that VPI had no bad effect on magnesium engine parts.

In 1946, full-scale engine service tests

were conducted and engines were processed with VPI and shipped to island stations for service. The favorable results of this test confirmed in the treatment of a production publication for VPI presentation of P&W R-2800 engines.

► **Other Users**—In the tests, were also directed to six VPI products, mainly for engines in dependent stock up. A P&W R-4360 propeller engine, equipped in VPI paper, then simply covered by tarpaulins, was stored in Hawaii on the open deck of ship. Now all shipments go this way. The PAD VPI 200 can reduce such losses. The job of preventing parts in storage or shipment. An outstanding example, in an application in R. M. Heilbrunn Corp. This firm employs VPI as an additive to inhibit corrosion in its water hose, non-flammable, 11.2 inch diameter, used extensively in the Navy.



COMFORT ALOFT

These newly designed seats will be installed in DC-48s now on contract by KLM, KLM, SAS, and Philippine Air Lines, according to the manufacturers, Harston Tool & Engineering Co. They will also go into KLM's 1049 Super Constellation. The Los Angeles company points to these features of the seats. Each mounting permits the user to sit in any position, fold 70-deg. recline with knee brace for day sleeping, recline of leg rest, service table and two positions for rest, automatically controlled without touching the seat, stored for back up to 90° maximum under seat leg brace.



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For 24-speed supercharger control ADEL has designed and manufactured a selected speeded selector valve. The two speeds are dependably selected by this valve which has only two positions and provides full-speed operation as well as electrical failure. Since all the other advantages of this latest example of ADEL's ingenuity of design and precision manufacturing are:

- ELIMINATES ELECTRICAL ACTUATOR MECHANICAL LINKAGES AND ADJUSTMENTS
- POWER OPERATED BY ENGINE OIL PRESSURE 12 HIGH-BODY POSITION
- NO POWER REQUIRED TO FAULTSAFE STOP
- BLOWER POSITION
- BLOWER-STOP COMBINED
- KEYS COPI
- COMPLETE INSTALLATION
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For complete engineering specifications and general information, address: ADEL DIVISION, GENERAL METALS CORPORATION, 17173 Van Cleave Street, Bel Air, California

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Now, for the first time, propellers can be studied while spinning at supersonic speeds. Every action and reaction of new propeller designs can be watched under conditions that reproduce exactly every detail of flight. This supersonic spin pit, developed under

Navy and Air Force contracts, is in itself a radical advance in research and testing techniques. And, coupled with the full facilities of General Motors, it will help increase the leadership Aeroproducts now enjoys in the field of turboprop power—the field of supersonic speed.



The Douglas X-42D with dual rotating propellers is one of several Navy and Air Force planes of supersonic speed which benefit from the efficiency of Aeroproducts designs.



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GENERAL MOTORS CORPORATION
DETROIT, MICH.

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Designing for tomorrow



Aeroproducts

Sierracin Used In Edge-Lighted Panels

Edge-lighting of instrument panels is a new and practical application recently developed for Sierracin, a polycarbonate plastic well known for its use for instrument windows and cowlings in pressurized aircraft.

The panels, cast in one piece, consist of a transparent core coated on both sides with thin layers that absorb then non-reflecting black-pigmented Sierracin. Panel markings are produced by engraving through the black and white layers to a depth of .004 in. The letters are grey-filled with Sierracin. A .007 in. translucent white plastic is adhered to one. Then the entire panel is washed with lacquer thinner.

Small bulbs are placed in strategically located holes throughout the panel and transmit their light (usually red, but any color may be used) through the transparent inner core to emerge uniformly at the listening intensity may be controlled by rheostats. The bulbs, removable from the front of the panel, are covered with caps sealed with polyurethane to make the panel absolutely light-proof. Surfaces of the panel are scratch and puncture resistant to prevent light leakage through normal use.

Edges are possibly coated with the same materials used for surface coating. An etching catalyst is used to prevent fast driving and an opaque white is used to give added protective against light leaks at edges, corners and hole rims.

► **Conservation Panel**—The non-cracking, thermosetting plastic panel, design number 5005, coming under Army Navy spec. AN-84, meets standard, lacquer thinner, methyl ethyl ketone, standard commercial solvents aviation gasoline. Hydrol and AN O 86 hydraulic fluid. Temperature range is -70 to +250 deg. and it stands salt spray and salt water moisture. Being integrally molded in one piece eliminates the possibility of delamination.

Some Physical and Chemical Properties of Sierracin #5005 Panels

Tensile strength—9,000 psi
Tensile strength—15,000 to 20,000 psi
Resistant to common fuels, oil, etc.
Heat distortion point—170 deg. F
Thermal conductivity—4.5
Thermal expansion (100° F to 150° F)
Compressive strength—30,000 psi
Laminar light transmission—95%
Electrical properties—Excellent

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Helicopter Part

The tapered steel tube shown above has been successfully turned into the backbone for a helicopter rotor by the Tiber Refracting Corp.

The steel tube is split lengthwise to eliminate changes in diameter and wall thickness. Propagating from both

tips of slots, diameter and thickness decrease in size through five successive steps.

A big advantage is gained by forcing this part by the compressive pressure, the firm says. It reduces warping, providing a tube that is "true" perfect with respect to bore, weight distribution and finish," the company claims.

Tiber Refracting Corp., Wallingford, N. J.

4,000-psi. Air Valve

A lightweight check valve for pneumatic systems, designed to operate efficiently at air pressures up to 4,000 psi, has been developed by Robert Mfg. Co.

The new unit is valued by its maker to be the only 4,000 psi check valve for pneumatic systems now on the market. It also is suitable for hydraulic pressures up to 5,000 psi, the company adds. Proof positive of the new check valve is 9,200 psi.

The unit, a free flow type, is made of stainless steel, weighs 3.4 oz. The outer cylinder is a standard AN 6149 B envelope, while both ends of the unit

have fittings for 8 in. tubing, in accordance with AN 10056.

Other performance data listed by the firm: Maximum free flow—7.8 lb./min.; maximum pressure drop through valve—100 pug. at 150 lb./min. in free with an air inlet flow of 150 pug. maximum; leakage in reverse flow (check)—does not exceed 200 cu. in. of free air/min. at 4,000 psi.



B-47 Volt Control

A compact d.c. electrical control unit, featuring a number of new features aimed at giving better high altitude operation, is being produced for the B-47 Strategic bomber by Jack & Shultz.

It includes an improved carbon pile voltage regulator and internal relay all neatly packaged into a single light weight control panel. The panel's phono type can be quickly slipped on

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- Vibration-Proof
- Light Weight
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- Easy Assembly and Disassembly
- Proven Tests that say other Connectors are not as good as Bendix

The importance of a completely moisture-proof electrical connector has already been emphasized. In addition to this important characteristic, there are a host of other features that make Bendix Scinflex connectors outstanding for dependable performance. For example, the use of Scinflex dielectric material, an exclusive Bendix development, is evidence of outstanding ability,

assures resistance to flash over and arcing; its temperature extremes, from -67°F. to +275°F. performance is remarkable. Dielectric strength is equal to 300 volts per mil. If you want more for your money in electrical connectors, be sure to specify Bendix Scinflex. Our sales department will be glad to furnish complete information on request.

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High dielectric strength... High insulation resistance... High current capacity... High voltage drop.



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In addition to SWEDLON, we have also developed applications for the aircraft industry.





In Kalamazoo or Kalamazoo, it's performance that counts! And Silicone Rubber is recognized around the world for the production of custom silicone rubber parts, engineered for superior performance. These Silicone parts are used in jet engines, aircraft bodies and instruments as well as in transformers, marine equipment, chemical and electronic apparatus, electrical applications, etc.

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Stewart is equipped to mold, extrude, punch, lathe-cut and manual build precision rubber parts to meet SAE, AIAA, and individual requirements as well as 58 specifications under MIL-B-8865 (superseeding ARMY 20-1144).

STURGEON HUBBEN COMPANY
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as all a standard motor. The unit can be interchanged between the B-57D and B-47C. Only parts not included on the panel are the main line connector and a current relay. The unit is adaptable to any railway or commercial phase, Jell says.

In the regulator, special attention has been given to heat transfer, creep and traction problems. The fix area has been increased. The regulator will dissipate 10 watts continuously at 50,000 ft. altitude without blank cooling, says the firm. A "mechanical" spring reportedly has shown excellent results in matching the magnetic force curve, permitting the regulator to operate long periods without change in voltage setting.

Among other points highlighted by the firm, An equalizer relay shunts the regulator circuit between regulators to reduce current imbalance, overspeed protection is provided by two relays, one as overvoltage protection indicator relay, differential voltage and reverse current control is provided by a double-duty relay (doubles as one relay) that has only one of handling both full line voltage and voltage of reversed generator, a 40-ohm load resistor is connected from the bus to prevent generator reversal. It adds to normal control voltage of the generator.

Jack & Fletcher Inc., 17800 Broadway, Cleveland 1



"Toolless" Clamp

A new clamp for securing bundles of wires in aircraft electrical systems, which can be opened or closed without use of tools, has been announced by Trenchum Products, Inc.

The clamp transforms into a T-shaped tongue. To secure the clamp, the tongue is embossed in the place, the tongue is inserted (by hand pressure) into a slot in a retaining clip covered by the screw structure. The clamp locks to the clip in a way that resists against accidental release, says Trenchum.

The clamp holds bundles of 5/16

Lockheed

SETS PACE IN CARGO FIELD

Look to Lockheed for the first cargo transport designed purely for turbo-prop power. It's the new L-206—successor to the U. S. Air Force request for greatly stepped-up range combined with speed, capacity and loadability. Designed in 5 months, the L-206, with the company's wing area among 3,000-sq-ft aircraft. For exceeding minimum specifications, it features no interior Lockheed means: a new streamlined fuselage, a power-assisted cabin, a pressurized cabin, a clean interior, line of interlocking protrusions, a uniform tie-down fittings, a integral loading ramp. The L-206 will have power windows in its back high floor, only 43" off ground.

What's going on at Lockheed? Lockheed will check into a billion dollar loading when production starts in the new 100,000 sq ft plant in Marietta, Ga., now being built for the B-47 jet bomber. In Marietta assembly lines are being mechanized once again for faster jet production. New employees are being hired at the rate of 500 per week. Estimates of total expansion in new under way, including expanded facilities for all various aircraft.

What's being done about Lockheed?

AMERICAN AIRLINES July 8, 1961 "Lockheed's are now using C-47's (C-47's & Douglas's) for 100,000 sq ft per plane to be built and put. Equipment utilized has been increased."

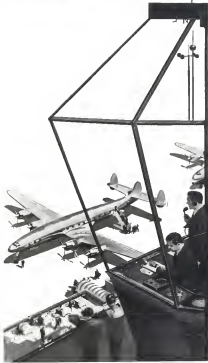
John Deere, Iowa, 1961 "The Lockheed, even after 12 years of life, is not now leaving the field of its type but is only in the role of a recently new one. When a company can produce an airplane for which it has a backlog of future production of 130 (April 1961) in 12 years, you know that that company has accomplished a major miracle of industrial development. And that is, without further the accolade of the Lockheed Constellation, one of the truly great airplanes of aviation history."

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Over 20,000 hours—the dependable Constellation has flown the longest distance—setting a record of more than 100,000 miles. And every 80 minutes a Constellation repeats the performance—proving experience in experience.

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Lockheed

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to 15-in. diameter. It can be used singly or in tandem. Transmitts only 10 inch maximum loading requirements for use as set forth by the Electrical Groups in Military Aircraft.
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Ford-G-Tail dynamometer, for measuring torque, weight or tractive loads, easily mounted, bridge instrument, on which loads are imposed, signals through cable up to 400 ft. to repeater indicator meter. W. C. Dillon & Co., Inc., 1421 S. Circle Ave., Torrance 1, Calif.

Hydraulic power units complete in series, pump and motor in compact package. Line (224 models) embodies low pressure units (1,750 psi.), Hi-Lo units with dual pressure sources and high pressure units (10,000 psi.). Model Engineering and Supply Co., 721 W. Broadway, Glendale 4, Calif.

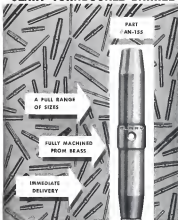
"Vibrostat" Model 364 vibration retractor units has range from 8 to 160 magnitudes at 500 c.p.s. plus low range 0 to 10,000-shock scale, will detect & tolerate at facility installation, also can be used for recent continuous testing. Associated Research, Inc., 5158 W. Belmont Ave., Chicago 15

Tensile-L-Matic will process burning compressed suspensions and coatings, permits greater abrasion action by keeping parts free of adhering material, oxidation, resulting in fast, high finish. Tensile-L-Matic, Inc., 4510 Bellvue Ave., New York 25

Link-Lock fingerlock lock for utility transit units, instrument cases, etc., has no springs, is designed for micro-factory specimens at extreme low loss pressure and to safely carry loads up to 1,000 lb. in tension. Research Factor Corp., N. Broadway, Albany 1, N. Y.

Aluminum solder rod (lead-free) melts at 400°F., flows at 425°F., can be applied with ordinary soldering iron. Not soldering all aluminum alloys (except 245T) as aluminum is dissimilar metals and particularly for work on electrically and mechanically. All State Welding Alloys Co., Inc., White Plains, N. Y.

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SECTION 3

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FINANCIAL

Aircraft Dividend Record

(Per Share)

	1951 PAID PER \$100	CURRENT MARKET	ESTIMATED—1951 EUTAL GROUPS
Boeing	1.15	27	2.00
Boeing	1.80	51	5.00
Boeing	1.00	46	1.00
Cessna	0.35	6	0.35
Consolidated Value	0.38	17	1.00
Curtis Wright, "A"	2.00	21	2.00
Curtis Wright, Common	1.80	10	1.00
DeSoto	0.25*	52	4.00
Grumman	0.60	7	0.60
Grumman	4.00*	25	2.80
Lockheed	3.00*	20	2.00
Martin	None	16	None
McDonnell	2.80*	58	1.00
No. American	1.25	31	0.25
Northrop	None	15	0.50
Republic	0.10	24	0.10
Ryan	0.20	9	0.40
Sears	2.00	12	2.00
United, Common	2.00*	11	2.00
United, Preferred	5.00	105	5.00

*Paid on old stock before split-up

Stability Means Regular Dividends

Huge procurement program puts emphasis on income
rather than speculative aspects of aircraft shares.

The aircraft group has assumed the
characteristics of an industry from
which stable, regular dividend income
may now be anticipated.

Until recently, regular dividend in-
come was not the strongest investment
characteristic of aircraft equities. Cap-
italism in growth situations, aircraft
companies for a long period of time felt
the necessity of hoarding all available
resources. This led to the "ploughing
back" of earnings, where payment, and
detested only taken as minimal divi-
dends to shareholders.

After World War II, outbursts and
renewed interest made for extensive ap-
proach in the corporate affairs of most
successful units. After this process was
completed, a change in national policy
took place calling for a reversal of the
downward rate of aircraft procurement.
This program was soon sharply accel-
erated by the Korean war. These condi-
tions hardly made for stability.

►Thoroughbred—Aircraft equities
found their greatest investor sup-
port from those seeking capital apprecia-
tion. This gave the group a highly
speculative, large. Long-range views
were required which meant excluding
company's ability to keep ahead in
current technological, economical ad-

vances, obtain orders, and convert such
business into a profit.

While very much of the same ap-
proach underlies investment thinking
toward the aircraft industry today, con-
stantly increasing airplane procurement
programs have transformed the aircraft
share outlook for the group. Increased
activity in relatively high levels ap-
pear likely for some time to come.

►Uncertainty—There is no irrevocable
facility to convert earnings reports into
definite steps have been completed. To
begin with, contract delivery was not
always full into next quarters where they
conform to fixed periods. A number of
aircraft companies include some esti-
mate for current earnings in their work-
ing process accounts. This revenue to
be substantiated at a later date. Even
then, there is no assurance that the
transition is accurately presented.
There remains the integration hurdle.
It may take at least a year and fre-
quently longer after a specific contract
is completed for the integration pro-
cess to run their course.

Under the stated circumstances, it
is not management that can positively
assure that unusually high earnings
currently being reported are real and
irrevocably in the bank. A few lines



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dividend policy presented on this assumption may later turn out to be a distribution of capital rather than of earnings.

It is in this condition which has led many aircraft companies to follow irregular dividend policies. In the past, the inclination was to make the bulk of debenture payments to stockholders at the year end when cash is the most plentiful. But more fully known semi-annual payments were also common practice in preference to the established quarterly distribution schemes to meet other publicly held corporate cash needs.

► **Dividend Change**—This past pattern of earnings distribution to stockholders by aircraft companies has now changed. An increasing number of builders have now adopted quarterly dividend policies. Among the latest to do so are United Aircraft, McDonnell, Sperry and Ryan.

Northrop's 25-cent-a-share payment to be made Sept. 14, is the first for that company since October, 1948. This leaves the Glenn L. Martin Co. as the only major aircraft company unlikely to pay a dividend to stockholders during 1953. The Martin Co. recently announced an adjusted net loss of \$4,490,148 for the last six months of this year. The company's loss from the Boeing-Steinbock Finance Corp. further multiplies against any such resumption of dividends. The last Martin payment was 75 cents per share in March, 1947.

► **Stock Split-Ups**—During the past year or so no less than five aircraft companies have declared stock splits. Frequently, in addition to creating a broader market outlet for the equity, the stock split also serves as a device to increase cash debenture payments. For example, early this year United Aircraft declared a 20% stock dividend on its common shares. It previously had been paying \$1.00 per share semi-annually, or a total of \$2.00 for the year. Following the 20% stock dividend it switched to a quarterly dividend debenture of 50 cents a share—maintaining the old rate on the increased number of shares.

At increased dividend rates, aircraft equities yielding 6% and better are not uncommon. This compares very favorably with most other industrial equities. In slower economic conditions, consistent equities are extremely in excess of dividend payments. It is interesting that United Aircraft equity yields have remained over a period of years for a number of years. This is particularly true for General Motors, Douglas and Curtiss-Wright "A."

Interest of aircraft dividend yields are bound to attract the attention of stock speculative investors who in the past have considered the aircraft industry too volatile and unsteady for long-term profitability.

—Selig Altschul



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needed in Seattle are experienced and power mechanical mechanical electrical electronics and mechanical and weights engineers for design and research. Some are aircraft designers and analysts and others work on path computers with advanced design.

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• **Overrange provision.** About 90% of scheduled airlines will have VOR receivers installed by the end of this year. But most of the installations are simple, not dual. That's a question whether the modern VOR can be made the primary means of navigation before a place has two receivers (one as stand-by). Until that is decided, or unless one gets delivery of dual receivers, the old inventory L/MF receivers can only remain the primary navigation instrument.

• **Terminal distance indicator.** CAB requested use of a terminal clearance or proximity indicator such as the radio altimeter some years ago. That was to warn the pilot of approaching obstacles, hills or ground level. But many airlines had such difficulty with maintenance, misinterpretation and failures that the CAB order was rescinded. Reports are that many airlines still consider the instrument inadequate so far, although the military have used it since early in World War II.

These are some of the main automatic equipment programs first built when and now equipment experts consider important in all weather safety programs, although some may not be quite ready for first operation. Many of these instruments are dependent on ground installations.

• **Airways Establishment.** CAA's total airways equipment budget this fiscal year will be between \$5 million and \$15 million—depending on House-Senate compromise.

That's much less than the \$15 mil-

lion CAA requested from Congress, but CAA may be able to step up some ground equipment projects for more navigation safety, at the expense of other planned projects aimed more at convenience than safety. Aids mounted for more CAA airports last week by pilots and airline spokesmen were more identification of ground equipment instead of aids more for more efficiency on ILS and VOR.

VOR, containing it to be the standard navigation aid. It may be that CAA can defer some other aids while it gets the VOR system improved.

All presently installed ground aids already themselves by coded dot-dash dot signals. The array or distracted pilot sometimes misreads the code, or just assumes he tuned in the right frequency and doesn't check it. Misidentification of a single beaconed some air routes as marker navigation, and some chances are getting misidentification of a range station might have caused the crash June 30 of a UAL DC-6 in Colorado.

CAA plans ultimately to change all range and marker stations to voice.

But the present program is for a gradual shift to voice, although installation of a voice indicator at a station is not considered an expensive modification.

• **Airline Operations.** CAA says airlines to speed their transition from low-frequency frequency aids to full utilization of the new very high frequency VOR, GCA and other modern aids and controls. But many airlines and their pilots want to move into that carefully. They are using the VOR equipment and make ground control slow where available. But they don't put full trust

in them yet. There are still some unexplained failures of ground and airborne equipment. Nevertheless, maintenance of both is improving at a rapid rate. By the next year, the airlines will mostly be using the new very high frequency aids in the primary navigation system.

Airlines, pilots and government men agree that stepped-up maintenance, test and utilization of modern ground equipment is the fastest way to all-weather flight safety. Pilots are becoming braver, with most of the workload that remains. There is more room for improvement in equipment than pilots, all observers seem to agree. They urge equipment to make the pilot's job simpler and more efficient. They want simple, sure equipment monitored by other equipment, as well as increased pilot training in all-weather flight technique and discipline.

Try New System of Settling Accounts

Three major trans-Atlantic carriers are conducting a joint trial-run in the use of distance instead of currencies for settling accounts between them through the International Air Transport Ass'n's Clearing House. The new scheme promises to achieve desired time and cost savings over the previous method used.

For the latter half of this year, Air France, British Overseas Airways Corp. and Pan American Airways will bill each other for space sold on the other's behalf in terms of dollars involved, automatically weighted by coefficients to allow for relative discounts and surcharges. At the end of each month, each balances for each company will be struck by an offset of credits and debits and the result rendered into terms of cash by the use of daily rate figures.

Up to now, the practice has been for the selling airline to compute the value of the space sold in terms of currency and convert the result into the currency used by the companies who actually earned the traffic. The checking and rechecking by all companies concerned required thousands of man-hours yearly and resulted a considerable loss by the the ultimate settlement of accounts.

An initial test of the new system was made by British European Airways, Deutsches Lufthansa, Dutch KLM, Belgian Sabena and Swissair on intra-European journeys, and it was found that that there was a difference of only one-ninth of one percent between the results obtained by the new method and the older system, with the latter still subject to at least several weeks of checking.



Outstanding NEW JET ENGINE

One of the most powerful turbojet engines in the world, the new Westinghouse J40 develops thrust equivalent to 14,000 hp at modern flight speeds. This power output will be approximately doubled by the addition of an afterburner.

INTEGRAL AUTOMATIC ELECTRONIC CONTROL

This is the first turbojet engine with a completely integrated, automatic electronic control system to pass the stringent type test of the combined U. S. Military Forces. Complete operation from start to stop, shutdown and speed is accomplished with a single cockpit control—leaving the pilot free to attend to

navigation, battle tactics—battle itself. This is only one of the many distinctions of the J40 which places it in the forefront of today's jet propulsion field.

Look for further developments about the J40... it will spark a whole new group of speedier, high-performance military aircraft. Look to Westinghouse research and engineering for constant progress in jet aircraft power.

31661



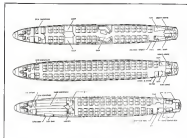
VERSATILE CARGO LIFTER

This hydraulic truck lift, with a platform 9 ft. x 15 ft., capable of handling 5,000 lb. loads, is being used by Flying Tiger at flight stations in Chicago and Cleveland to speed loads to and from the plane. It's

expected to cut usual loading time in half, save flight loads may be loaded on the platform in advance and then quickly moved when the plane arrives. How it's used by C-46.



YOU CAN BE SURE... IF IT'S
Westinghouse



SUPERCONSTELLATION VERSIONS

Lockheed Aircraft Corp. offers several interior arrangements of its Super Constellation for its carrier needs. The "Inter-Constellation" at top, is a 14-seat luxury version, with cabin in the center of the fuselage. The standard layout, the chief new version up four could be replaced by eight more pas-

senger seats. The "Inter-Constellation" version, would carry 205 passengers in five-aboard seats at 19-in. intervals. The bottom floor plan shows combination passenger-cargo version, with room for 50 passengers and 1,140 cu. ft. cargo space up forward. A 500-cu. ft. cargo door facilitates loading.

CAB Estimates LAA Mail Pay

Metropolitan helicopter operator Los Angeles Airways has a Civil Aeronautics Board showdown over setting final mail pay. CAB proposes to pay LAA \$1,151,190 or \$1.30 a plane mile for Oct. 1, 1947-Dec. 31, 1950, and current rate of \$1.30 a plane mile for the first 30,000 mi. a month and 66 cents for additional mileage.

The 1947-50 rate is figured by CAB to give Los Angeles Airways "a fair return on the approved investment computed at 7% in accordance with established Board policy." The revenue over to \$67,406 on investment of \$295,205, with allowance for \$17,990 interest and \$4,625 state income taxes.

The new current rate of \$1.30 is figured to give an estimated operating profit margin of 9.94 cents per plane mile to provide a fair return and "continued development of the helicopter equipment." The rate is set as estimated operating margin instead of investment return because investment is too small to make it a reliable yardstick for measuring future mail pay need. Estimates are the company's own, which CAB agreed indeed acceptable.

CAB allows LAA President Clarence

M. Behne a salary of \$15,000 a year starting Jan. 1, 1951 "because of the general change in economic conditions." But CAB cut his salary, down \$1,737 to \$13,000 a year for 1947-50. The base for this was stated as the Texas Airways mail rate case. "Why not a similar rate on heavily on mail pay support it is believed that the maximum salary for dual executive officers that should be undertaken by the government in case of mail service element is \$13,000 a year."

TAA Traffic Up

(McGraw-Hill World News)

McBosne—Sharp traffic gains marked Trans America Airlines' first half of the current fiscal year. Revenue passenger miles rose up to 283,371,008 (a 15.4% increase over the same period last year). The number of revenue passenger miles was 806,574, a 15% increase. Revenue freight increased 27.7%, to 12,990,000 lb., and mail was up 10.9% to 5,695,182 lb. The number of undeposited cargo miles went up to 21,767 from the previous 16,141. Parts of all were increased from 36 to 51.

TAA has sent an engineer to London to record techniques to raise rate of its steadily rising business. A newly bought DC-4 will fly come to McBosne

CAB Takes Over Housekeeping Job

The Civil Aeronautics Board will handover to all its own administrative housekeeping. CAB takes over from CAA its own accounting services, payroll preparation and necessary processing.

CAB's budget and fiscal action will do CAB accounting and payroll work. The CAB general service section will be in charge of the government operation.

This administrative change was recommended by the Congressional Aviation Policy Board and the Hoover Commission. The step is also in line with provisions of the Budget and Accounting Procedures Act of 1950, the Board says.

The Board has also announced that it has assumed its Bureau of Administration in the Office of Administration.

TACA Inaugurates New Service to U.S.

San Jose, Costa Rica—A new daily flight connecting the capitals of five Central American republics and New Orleans with "same day" service has

been opened by Transportes Aereos Costarricenses (TACA). The DC-3 flight leaves San Jose at 4 a.m. every day but Sunday, and goes to Managua (Nicaragua), Tegucigalpa (Honduras), San Salvador—where passengers transfer to a DC-3—and Guatemala City, landing at New Orleans at 2:15 p.m.

The before-dawn takeoff from San Jose sets a night flight precedent in Costa Rica, since the little, non-scheduled Sabana Airport has hitherto been restricted to daylight operations. Prior to inaugurating the service, TACA made extensive night takeoff tests from the field, using five parties.

Brazilian 1950 Air Travel Marks

(McGraw-Hill World News)

Rio de Janeiro—Renas do Brasil and Cruzeiro do Sul have the spotlight as Renas leading airlines in official ceremonies at their 1950 transport operations.

Passes carried 250,100 passengers, 4,946 metric tons of baggage, 5,018 metric tons of freight, while Cruzeiro do Sul flew 258,329 passengers, 3,365 metric tons of baggage and 6,328 metric tons of freight last year.

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Here's another time-saving, cost-saving Northrop production technique:

F-89's rugged lower main beam, less strategic material, less machine time because Northrop production engineers use simple, low-cost phenolic resin dies in place of conventional metal dies for forming thousands of high-strength metal parts. This technique is part of the production knowledge that delivered B-29, Wildcat on time in World War II—the same knowledge that's speeding the production of the deadly F-89 Northrop Scorpion, standard of world's air forces of the U. S. Air Force.

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is engaged in the development of automatic and supervisory control engines and related control and accessory equipment. Our production line is turning out control engines under government contracts.

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TEST FACILITY DESIGN
ENGINEERS—
COMBUSTION DEVELOPMENT
ENGINEERS—
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700 Westchester Ave., Yonkers, N.Y.

ENGINEERING ADMINISTRATIVE POSITION

One of the largest defense manufacturers has an opening for an exceptionally well qualified engineer with an extensive aircraft structural background and experience in structural stresses. Experience with advanced degrees will be given preference but those with B.S. degrees will be considered.

Responsibilities include the introduction of highly accurate research projects in all fields of stresses and aircraft structural analysis and design.

Applicants should submit summary of education and experience to:

P-1598 Airforce Week
11 First Street, San Francisco 4, CALIF.
(Our employees know about this ad)

STRESS UNIT CHIEF

Opening for experienced man to supervise the construction of a new branch in production work mainly in the Boeing B-27 jet bomber program for the Air Force. This position may be the basis of structural analysis and other related stress tests. Must be organizing genius, preferably to work, unencumbered in environment, with a minimum of ten years experience in this field. Must have full secondary education.

Write for position blank or submit personal history including education, work experience and references to our Administrative Department.

BOEING AIRPLANE COMPANY
Wichita, Kansas

STRESS ANALYST AND LAYOUT ENGINEERS

for military aircraft engineering in small expanding company.
ANDERSON, GREENWOOD & CO.
Marlborough Airport, Marlboro, VT, Telex

applications requesting either new permanent certificates in lieu of their temporary international route certificates expiring next July 4. PanAm asks no charge in the present international route structure. But TWA asks CAB to eliminate PanAm from Central and Southern Europe, especially from Rome. TWA asks a return to what it calls "area competition"—meaning competition to the London and Lisbon gateways to Europe but no competition between the two carriers within Europe and the Near East. TWA says this was the CAB policy until the President changed it in his decision last year overruling the Board's denial of the PanAm-American events merger.

SHORTLINES

► **Air France**—Reports a profit of 10,325,735 francs on its worldwide operations in 1950, figuring equipment amortization "very much on the same basis as that projected by other airlines." Schedule was reduced to 8% of total operations. Air France says Passenger load factor continued "superior to 65%." Passenger kilometers increased 14% to 1,154,923,830. Ton miles gained 16%.

► **Alt Transport Association**—Nathan Feinstein and Accounting Committee has published "regulation and destination airline traffic survey of overseas passengers for September, 1949." This survey is made twice a year, based on CAB figures. CAB formerly used the report, but ATA now offers them at \$25 per set.

► **BOAC and BEA**—Britain's two government-owned international airlines report a total operating loss of \$157,524,598 in the fiscal year ended March 31, compared with a loss of \$25,648,000 a year ago. British Overseas Airways reduced its losses 41% to \$12,781,375. British European Airways reduced its losses 25% to \$2,741,200. Both BOAC and BEA report they are planning air coach type operations, with "the possibility of extending the benefits of air travel over widely."

► **Eastern Air Lines**—Has extended New York summer extension into New York-Miami to Oct. 31. This extension first-class increases rate to \$114, second class with standard round trip fare of \$144 and night air coach round trip rate of \$107.

► **California Eastern Airways**—Is still soliciting more than 14 hours per week utilization of its DC-4s on the Pacific route. In the first year of the (Continued on p. 75)



Photo courtesy of the U. S. Air Force/Boeing Company P-8

... A BETTER MATERIAL FOR AIRCRAFT ENCLOSURES

PLEXIGLAS II

For transparent enclosures on aircraft, there is a preferred material—PLEXIGLAS II—motion's standard transparent plastic for the post war years. An improved grade of the acrylic plastic, PLEXIGLAS II, is now being used on many of today's aircraft. Developed in Rohm & Haas laboratories, and backed by intensive research and physical testing, PLEXIGLAS II has improved resistance to heat, weather, and cracking.

PLEXIGLAS II meets Army-Navy specifications (MIL-PS42E) for material used in transparent enclosures on current powered aircraft. For

the planes of the future, Rohm & Haas laboratories are working to raise the quality of transparent plastics to even higher levels.

In order to help you make the best use of PLEXIGLAS II, we have prepared a Handbook for Aircraft Engineers. Just off the press, this 86-page manual contains detailed technical data on the use of PLEXIGLAS in the design and installation of aircraft enclosures. Write to us for your copy.

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TETERBORO, NEW JERSEY

(Continued from p. 72)
Korea war, CEA reports it flew nearly 34,508,000 passenger miles carrying over 7,000 passengers including over 450 latter patients. Using two to four DC-4s at all times, utilization averaged 15 hours, 19 minutes per plane per day.

► **International Civil Aviation Organization—Legal** committee meeting starting at Madrid this week will work for revision of existing international law limiting airline liability for passenger injuries. Present regulations accepted by more than 50 airlines were made in 1929. Mexican liability of an airline for passenger injury on international flights is now \$5,250. Some nations want the limit raised.

► **KLM Royal Dutch Airlines**—Reports show the first six months of this year up 35% over a year ago.

► **New York International Airport**—Tidepool reports a new world record for trans-Atlantic mail—1,422 passengers.

► **Northwest Airlines**—President Carl Hunter reports his decision that no airline compares with NWA as an employer. "Although Northwest has been approached in recent months by several airlines, none of their conversations were initiated by Northwest and none has been anything more than exploratory."

► **Philippine Air Lines**—Reports set profit of \$536,482 for the first half of 1951 compared with only \$18,473 a year ago. Load factor was 79%, compared with 69% a year ago.

► **Robinson Airlines**—New York local service airline has put its sixth Douglas DC-3 in operation and says "more planes will be acquired soon." All Robinson DC-3s are now seat 24 passengers.

► **Southeast & Western Airlines**—Reports a record 1,063,563 pounds of air freight carried in July.

► **Trans World Airlines**—Reports a record 512,000 air coach passengers carried June-August this year. TWA adds a fifth daily coach flight due end of this month. This will be New York to San Francisco via Chicago. Its opened sales offices in Nice, France, and Lima, Spain.

► **United Air Lines**—Starts its big quarterly anniversary celebration and promotion campaign this week in 32 cities. UAL in 27 years has carried 7 million passengers, 42,974,000 pounds of mail, 75,075,000 pounds of air express and \$8,703,000 pounds of air freight.

ENGINEERS



Good Year Aircraft Corporation, one of the world's largest aircraft development companies, has in the field, now offers unusual opportunities to engineers, both experienced and recent graduates, in all branches of aircraft design and development.

In addition to introducing airplanes and rockets, Good Year Aircraft builds a number of vital aircraft components as well as related machine tools and other material for the defense program. The diversification of products, beyond purely defense needs, at Good Year Aircraft, has resulted in an unusually stable and progressive employment situation year after year.

Excellent positions with accompanying liberal employee benefits and bonus for extended work week are open to:

**AERONAUTICAL
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Personnel are needed in the following classifications:

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STRESS AND WEIGHT ANALYSTS

Profound experience and formal education desirable. However, applicants without formal training but with equivalent practical experience in other engineering fields will be given consideration.

You are invited to investigate these opportunities by submitting a resume of your qualifications and experience to the nearest office or to an application address at which will be given prompt and careful consideration.

Address all correspondence to
Mr. C. G. Jones, Salary Personnel Department

GOOD YEAR
AIRCRAFT CORPORATION
AERON 15, CHGO

79

WHAT'S NEW

Telling the Market

Blueprints for Faster, Better Production details coated abrasive and gold abrasive cutting specialties designed for metal finishing. It is contained in a folding cover that can be expanded into a permanent wall chart. Write Behr Manning Corp., division of Noram Co., Troy, N.Y. . . . Eight-page illustrated brochure describes expanded facilities and production capacities of Tube Bends, Inc., New Britain, Conn., specialists in design and production of custom tubular aircraft parts.

Revised edition of handy reference booklet dealing with copper and copper-alloy die pressed bearings also carries tabulation of physical properties. Address: American Brass Co., Dept. DPC, Wheeling, 20, Conn.

A novel slide-chart designed to quickly identify A-N numbers of structural steel data, screws, bolts, nuts, con-
tact pins and washers can be obtained from **Arch Chemicals Metal Products Co., Inc.**, Easton-on-Hudson, N. Y.

Authenticity, physical recommendations for cleaning, deodorizing, rinsing and drying of aluminum are prepackaged for trouble-free spot-cleaning are contained in 18-page booklet available from Quikrete Products, Inc., 157 Throats St., New York 6, N.Y.

Booklet dealing with fabrication and design of nickel and high nickel alloy pipe and tubing contains numerous drawing photos, also tables on the chemical and physical properties. ASME code requirements, welding procedures.

said to fabric. Wants the Nickel Information Service, International Nickel Co., 67 Wall St., New York 5. The source also has available a **Guide to Selection of Engineering Metals**, a 25-page basic reference for design engineers giving characteristics of random nickel and alloys.

Detailed data on Bundy aluminum Hyflex and Hyflex electrical connectors for all service approved aluminum aircraft conductors are contained in technical bulletin HY4 available from Bundy Engineering Co., Inc., New York 14.

A 32-page engineering manual 33-A detailing General Controls line of H-G automatic controls for aircraft can be obtained by writing the firm at Glendale, Calif. 17-page catalog giving engineering data on aircraft hose assemblies, is offered by Restolite Corp., Belleville 9, N. J. — Catalog 548 giving complete specifications on more than 70 types and sizes of monolithic ball bearings is available from Mahrstar Precision Bearings, Inc., Kew-Forest, N. J.

Follows list all of E. F. Duco & Co's products for the aviation industry including carbon and parts cleaners, corrosion preventives, emulsion cleaners, paint strippers, polishers, solvent cleaners, steam cleaners and special compounds. Write Aviation Products Department, E. F. Duco & Co., Inc., New York 10. **Electronics** 34

New Copper Clad Metal is a folder which shows how manufacturers can stretch critical copper supplies up to four times using this process. Write: American Gladrush Co., Carnegie, Pa.

Cervicostitis method of punch and die cutting is detailed in 20 page manual being distributed by Corin de Puy.

Corp., 43 Wall St., New York 5, N. Y.
Catalog 72 gives listings of Micro
switches conforming to MIL-S-8793
and MIL-S-8794 and listings of switches
conforming to JAN-S-6. Write Micro
Switch Division of Minneapolis Honey-
well Inc., 10000 Franklin Ave., Franklin, MN.

Descriptions of Townsend Nylonk and Tufflok belts are carried in new tables available from Townsend Co., New Brighton, Pa. . . **Assembly Suggestions** is a 24-page booklet covering new fastening developments at an aid to designers and product engineers. Write: Makaproof, Inc., 2384 N. Koeler Ave., Chicago 29, Ill. The company also stocks available a new booklet on advantages and applications of power screw drives, showing detailed features of the Makaproof unit.

New Addresses

William C. Ward Associates, Inc., has moved to larger offices at 505 Fifth Ave., New York, 18. Phone is MUlsey 03-01, 7-2850.

Henry M. Ghose, Inc., operators of Dallas Aero Service at Love Field since 1945, has moved its plant and equipment to Dallas-Garland Rd. & Loop 12, Dallas. Phones are FAirdale 2875 and 2876.

Cannon Electric Co. is the new name of former Cannon Electric Development Co., division of Cannon Manufacturing Corp., 5209 Humboldt St., Los Angeles 33. Phone number is CAmet 5-1251.

Personal Airplane Sales Corp. has moved facilities to Hangar A and C at Westchester County Airport, White Plains, N. Y., from its previous location at Roosevelt Field, N. Y. New phones are White Plains 6-8535 and 6-6000.

ADVERTISERS IN THIS ISSUE

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Demonstration of sea rescue by helicopter is made near Larnaca-Salmon, Portland, Is.

Westland-Sikorsky 354 of 700 Squadron
R.N. Society, Enforcement and Survival

Daifang School. Runway entrance permits special access to school lunch facility.

Washington Roundup

New Secretary of Defense?

Secretary George Marshall is expected to retire shortly after the 1953 fiscal year defense program is worked out by the Defense Department early in October. He has long wished to.

Washington speculation on the new defense chief flows RFC Administration Staff Symposium.

► **Blackwater:** More Air Power—Reports from Gen Dwight D. Eisenhower's headquarters focus on two basic points.

► **Air power holds the key to defense of Europe.** Lt. Gen. Alfred M. Connelley, chief of staff, Supreme Headquarters Allied Powers in Europe, visited the Senate. "We speak a great deal of ground defense, but I would like to make it extremely clear that as far as Gen. Eisenhower is concerned, and I am sure as far as our headquarters are concerned—and I would say for as most military men are concerned—the power will be the dominant factor in the defense posture. It is of overriding importance to us. Gen. Eisenhower has the staff working in every possible way to improve the air picture."

► **The future European defense build-up program falls far short in its power of the front military men rank down as "near" to meet Russian aggression.**

This seems to be the picture.

► **Russia has an estimated 5,000 tactical aircraft available for operations in Europe.** It's likely this force will increase by the year.

► **SHAPE leaders want a two-to-one superiority in air power to counteract Russia's more than two-to-one advantage in ground troops.** SHAPE's target of about 60 European based divisions compares with Russia's 175.

This would mean a tactical air force in Europe of 18,000 planes—270 wings.

► **But under the proposed program, by the June 30, 1954 target date, SHAPE's tactical air power will fall short of matching Russia's even one-to-one.**

Mobilization Timetable

This is the new schedule the Administration's mobilization program is going by.

► **Target date for readiness for a major war June 30, 1956.**

► **Peak in military contract letting. It will be reached end of spring.**

► **Peak in military spending, reflecting deliveries it will be reached a year later, in the spring of '53.**

► **More Armored Divisions—Added to the \$13 billion in planes and parts that is added during the '52 fiscal year for the U. S. armed services, the U. S. industry's load will be increased by.**

► **Planes for Europe, Air Force and Navy will spend \$4,425 million on aircraft for Western European countries, \$325 million on aircraft for other non-Communist countries.**

► **Since Mutual Defense Assistance Program started in October, 1949, U. S. has spent \$1,125 million in assistance equipment for Europe, \$125 million in planes and parts for other countries.**

► **More Canadian Orders.** Prospect is that there will be an increase of Canadian orders for planes and parts soon.

Up to now there has been a ceiling of \$100 million on the amount of outstanding foreign orders for defense

equipment the U. S. could furnish. This is going to be boosted to \$300 million. Foreign orders pay when they get delivery.

Canada has indicated it will place orders up to the \$300 million between now and next July—mostly for aircraft.

But 46 other countries are interested in getting the U. S. financing.

► **Airline Subsidy Outlook—Opportunity to legislation approved by the Senate Commerce Committee taking the subsidy out of annual pay is developing on Capitol Hill.**

► **Defenseless Sen. John Williams.** A resolution against all subsidies of subsidy, will try to tighten up its legislative provisions for goods to scheduled airlines and flight carriers for "commerce" and "defense" interests.

► **Massachusetts's Rep. John Kennedy** will take up Postmaster James Doolittle's case against paying universal postal rates rates for foreign airmail.

► **Doolittle's case.** Doolittle's case against paying universal postal rates rates for foreign airmail.

► **UPU rates are negotiated, don't relate to the cost of delivery, and would mean a slice of subsidy in a proportionately "compensatory" rate.**

Meanwhile, industry leaders are strong for change.

► **Scheduled airlines want higher rates—Slick Airways and Flying Tiger Line.** Line of low subsidy cost.

These main apprehensions candidates will obtain some type of CAB certificate and clean eligibility for government support, too.

► **Nonprofits want it written into the law that they are eligible for subsidy in "commerce" and "defense" interests.**

Things to Watch for

► **Nonprofit's best friend.** Watch for Senate Small Business Committee to bring pressure on CAB to keep the nonprofits in business.

► **Committee's chairman, Sen. John Sparkman** branched the campaign with a Senate speech. He stressed, in lieu of a blanket "death edict," the Senate's new tactic to kill off the nonprofits one by one. His comment: "It may be a slower death, it may be less painful, but it is just as certain and it is just as painful and just as destructive to the economy and security of this country."

► **More subsidy.** Watch for new bills to push for legislation reforming the services to build up airbill by purchasing planes for lease to operations with 75% of these planes sold to the reserve.

► **They will open campaign in the new January session of Congress.**

► **Commercial jets.** Watch for action to seek tax-exempt money to finance development and purchase of jet passenger lines.

► **They are thinking it over.** The plan would provide the merchant carrier program to encourage an up-to-date.

► **Sen. Arthur Watkins.** Though at the present that developments for tax purposes wouldn't be allowed on planes bought with tax-exempt funds. Their question: "Would high taxes on planes cancel out the tax savings on the reserve pool?"

► **But legislation authorizing the government to finance passenger jet out-for the immediate future.** This reserve plan is the airlines' only hope now on the horizon of stimulating development of new commercial passenger lines.

—Katherine Johnson

(Editor Robert H. Wood, whose efforts usually appear in this page, is on vacation.)



1/2 YARD TO Touchdown!

The best is now coming to you—Fairchild Pacer and the Airborne Ranger is headed for a touchdown in the deep end.

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FOUR MORE RECORDS FALL TO G-E JETS

Thompson Trophy: A North American F-86 smashed the world's speed record for the 100-kilometer closed-course with a speed of 628.698. In warming up for the event, the jet also broke the closed-course record with a speed of 635.411.

Bendix Trophy: Another Sabrejet beat existing Muroc-to-Detroit records in winning the Bendix race with a speed of 553.761—averaging better than 25 mph faster than the previous record. The F-86 finished the race in a dive at sonic speed, after sustaining speeds of better than 650 mph over much of the course.

Chicago to Detroit: Four F-86s, averaging 672.189 mph, etched a new record in the skies from Chicago to Detroit, finishing the 237-mile course in less than 21 minutes.

Thompson Trophy: 628.698 MPH
Closed-course Record: 635.411 MPH
Bendix Race: 553.61 MPH
Chicago to Detroit: 21 minutes

Shattering existing records in every event in which they were entered, North American F-86 Sabrejets, powered by General Electric J47 jet engines, tallied a clean sweep at the National Air Races in Detroit.

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